

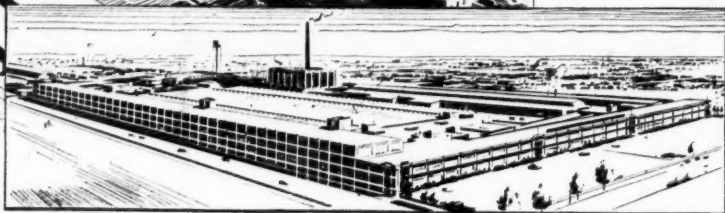
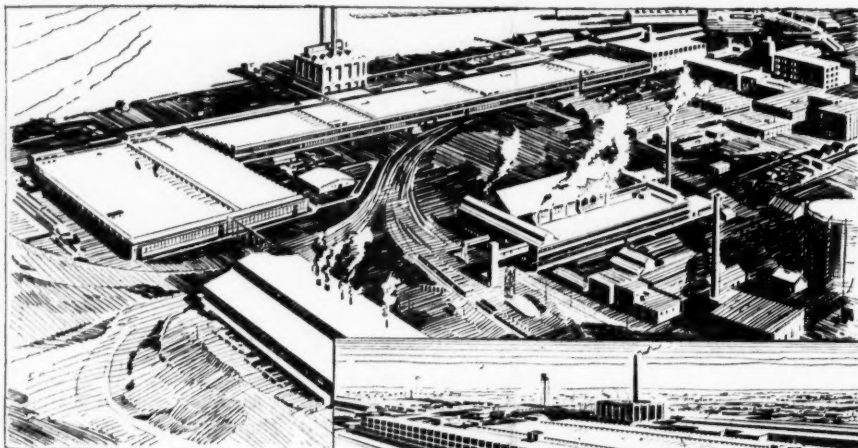
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Motor Wheel STAMPINGS

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Continental Motors



Car Dealers in Small Towns Boosting Accessory Business

Public will spend third of a billion for accessories this year. Larger proportion than ever before will come from the small communities.

By James H. Collins

DURING 1926 nearly one-third of a billion dollars will be spent by car owners for accessories. This does not include the great sums which will be spent for service, nor does it include parts or tires. The installation of accessories as factory equipment by car makers also has been excluded.

Under the circumstances it is easy to understand the growing trade interest in this great branch of the automotive industry. Particularly do we find a keen and intelligent interest in the accessories market on the part of car dealers in the smaller centers of population.

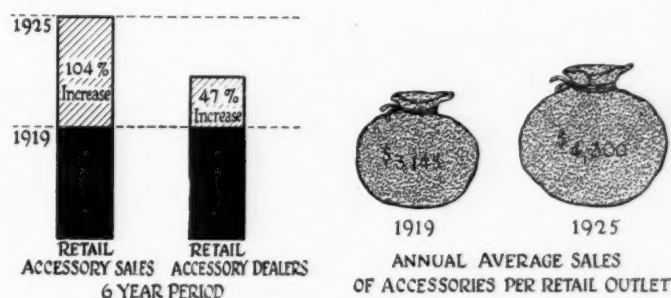
There is a two-fold reason for this increasing dealer interest in accessory sales:

- (1) Growing registration totals have more than doubled the market during the past five or six years.
- (2) Declining net profits on new car sales have made it necessary to supplement these profits by sales of what have been considered "side lines."

Sales Increase 104 Per Cent

During the past six years the number of cars in use has increased approximately 160 per cent. Over that same period of time accessory sales to car owners have increased about 104 per cent. That difference in the rate of increase is, of course, due to more complete factory equipment on current output. In spite, however, of the modern tendency of car makers to equip cars more completely with accessories, the great growth in the dollar value of dealer accessory sales makes this division of the business of paramount importance, both to manufacturers and to the trade.

In this connection it is worth noting that the rate of growth in dealer accessory sales has been faster than the increase in the size of the retail trade organization. The result is that accessory sales per dealer are higher



The above chart shows that during the past six years retail accessory sales have increased 104 per cent while the increase in the total number of retail dealers has been only 47 per cent. As a result, the annual average business per retail outlet now amounts to \$4300 as compared to \$3145 in 1919

today than ever before in the history of the industry. For instance, in 1919 the average annual sales of accessories per retail outlet totaled \$3145. During 1925 the sales of accessories per outlet averaged \$4300.

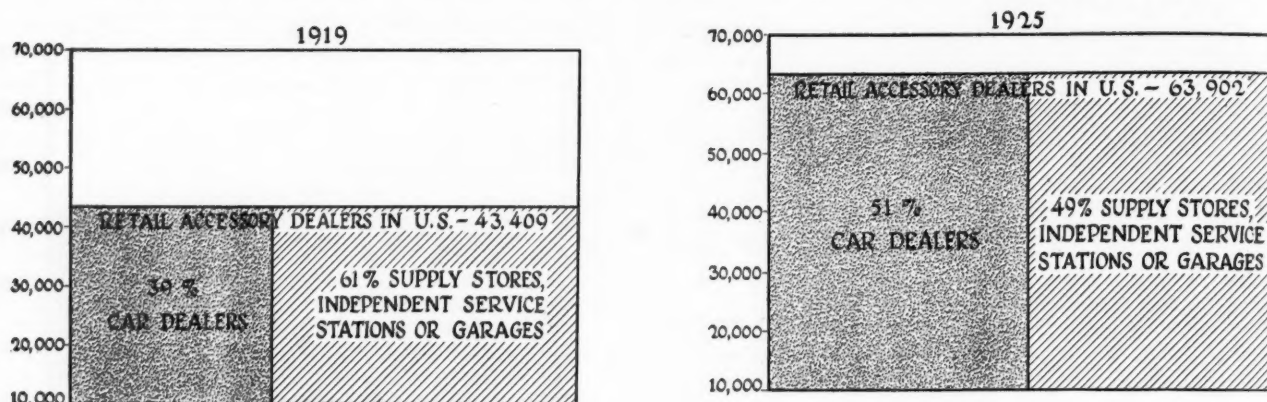
Putting the matter in another way, we find that over a six-year period, retail sales of accessories have increased 104 per cent, while the number of dealers selling accessories has increased only 47 per cent.

Is it so surprising that profit possibilities in the accessory field have engaged the active attention of the trade during the past few months?

Turning now for a moment to the car dealer and his place in this picture, we can develop some interesting facts. Six years ago, while car production was running only about 40 per cent of the present output, car sales were being made principally to new owners entering the field for the first time. The used car, as a problem, was just appearing over the horizon, and a substantial proportion of car sales were what might be termed "clean" sales, with no attendant problems of used car disposition.

Today we have the converse of this situation. With the greatest output in history, we likewise have the greatest

How the Car Dealer Has Moved Into the Retail Accessory Field



In 1919 there were 43,409 retail accessory outlets in the United States and only 39 per cent of them were car dealers. But note how the picture has changed. Today there are 63,902 retail accessory outlets and 51 per cent of them are car dealers. The decreasing margin of profit on car sales in recent years has forced the car dealers to take on other lines and a large proportion of them have turned to accessories.

trade-in problem in history. The result is three-fold in character:

- (1) A keener competition in the car selling market.
- (2) A doubling, and in some cases a tripling, in selling effort for the same net return.
- (3) A growth in gross sales of cars, but a decline in average net profits on these sales.

It is said that the pocket nerve is the most sensitive of any of the human anatomy. The average car dealer is a pretty good business man. He knows that a business thrives, not on gross sales, but on net profits. And he has begun to look around for ways and means to rebuild his profits. Hence, the accessory end of his business is receiving attention never before given to this branch of automotive selling. Stocks are being replenished and built up. New departments are being created. Salesmen are being trained to sell the "trimmings" as well as the car. In a word, the car dealer is ceasing to handle accessories merely as an accommodation for his customers, and for the first time is really selling the lines he stocks and represents.

Borne Out by Analysis

That this is fact and not theory is borne out by analysis of available statistics. In 1919 there were 43,409 retailers in the United States selling accessories. Of these, 16,800, or 39 per cent, were car dealers, and 26,609, or 61 per cent, were supply stores, independent service stations or garages. In 1925 the number of retailers selling accessories had increased to 63,902, but 32,571, or 51 per cent, were car dealers, while 31,331, or 49 per cent, were other retail trade units. The significance of these figures lies in the fact that while the total number of trade units selling accessories increased 47 per cent in six years, the number of car dealers interested in accessories increased nearly 100 per cent. In fact, almost the entire increase in the size of the retail organization handling accessories during the past five or six years has come from the ranks of car dealers.

Now what has all this to do with the small town as a market for accessories?

We know that over 55 per cent of all cars are sold each year in rural districts and in towns under 10,000 popu-

lation. We know that nearly two-thirds of the car dealers are located in these small towns. We know that approximately the same ratios hold for wealth and population.

Under the circumstances, it would appear that two-thirds of the accessory market should lie in the small-town field. There are available no complete figures showing the exact percentage of accessories sold in small towns, but we do know that until the last two or three years accessory manufacturers have looked to the larger centers of population for their real outlet. This has been quite natural. Many of these small towns have not shown sufficient business in their trade areas to justify the establishment of regular accessory stores. The local car dealers have given most of their attention to car sales. The result has been a lower quota of accessory sales.

Now conditions have changed. The car dealer, particularly in the small town, has been looking around for additional sources of profit. He has found that the percentage of profit on accessory sales is high. And he has proceeded to build up a real accessory department, reorganize and enlarge his stocks and train himself and his sales force on selling this profit-making side line.

The result is that accessories today are being sold in hundreds of small towns where five years ago there was practically no presentation. The car dealer in the small town is bringing the accessory business up to the level its importance justifies, and in so doing, is putting his own organization on a safer, sounder basis.

With these comparatively new sales outlets functioning efficiently in the great outlying market, the outlook is bright for the next year or two for the accessory maker with a good product and with national distribution.

POLAND is endeavoring to create a motor industry of its own, to render it independent of foreign countries. A number of plants are being established, the most important of these being Ursus, located near Warsaw, which is being put under way with the assistance of the Italian Ansaldo and the French Berliet firm. It is proposed to build 4-ton trucks on a scale of 500 per year. The establishment, which has received an order for 400 trucks from the Polish Government, employs 300 men. Near Lodz there is a second factory which is being established with British capital.

First Continental-Argyll Engine is a 3 by 4-1/8 in. Six

Has piston displacement of 175 cu. in. and S.A.E. rating of 21.60 hp. Company hints entire production eventually may be of single sleeve valve type. Working on model for aircraft.

By Leslie S. Gillette

FOLLOWING the acquisition of the patent rights throughout the world to the Argyll, or Burt-McCollum, single sleeve valve engine, the Continental Motors Corp. has developed an engine of this type which will be offered to automotive manufacturers within the next three months. Officials of the company hint that the new engine, which represents the first radical change made by the company in twenty-five years, during which period it has turned out 2,750,000 engines, may eventually replace its entire line of poppet valve engines.

Since the deal with the patent owners (Wallace, Glasgow, Ltd.), was consummated exactly one year ago, development work at the Detroit plant has been concentrated on a six-cylinder type of 2 7/8 in. bore by 4 1/2 in. stroke and developing 57 hp. at 3,000 r.p.m. The first production engine, which will be described in the following, while of the same piston displacement (175 cu. in.) and developing the same power as the experimental engine, is a 3 by 4 1/8 in. six. Argyll-type engines will be built in the same sizes as the present line of poppet valve engine, while in addition customers may specify their own cylinder dimensions.

There are now two passenger car companies and three motorcycle manufacturers in Great Britain and one automobile company in Switzerland building engines on the Burt-McCollum principle. These companies, the Argyll, Vauxhall, Enfield, Beardmore, Royal Scot and Pic-Pic, will now be required to pay royalties to the Continental Motors Corp.

At the request of Anthony G. Fokker, the Dutch airplane manufacturer, the Continental company is making plans for the building of an air-cooled radial airplane engine of approximately 200 hp. and embodying the single sleeve valve principle.

Simplified Operation

What mainly prompted the Continental in the purchase of the Argyll patents is the simplified operation of the single sleeve valve engine, which tends toward quieter operation, greater durability and lower production costs. No additional expenditure for special tools, is necessary, all present equipment being suitable for the production of the new engine. Other advantages claimed for these engines are better fuel economy, decreased weight, higher speed, and less vibration.

A. N. Niven, working under W. A. Fredericks, chief engineer, is in charge of the Argyll engine development at the Continental Motors plant. Mr. Niven was one of the pioneers of Argyll engine development in Scotland and is the inventor of several features incorporated in the engines.

Outside of the sleeves, their operating mechanism and the cylinder heads, the design of the engine is conventional and embodies numerous features common to all Continental engines. As previously mentioned, the dimensions of the first production six-cylinder engine are 3 by 4 1/8 in. bore and stroke, which gives a S. A. E. rated hp. of 21.60 and a piston displacement of 175 cu. in. With the standard compression ratio of 5 to 1, 57 b.h.p. is delivered at 3,000 r.p.m., corresponding to a brake mean effective pressure 87 lb. p. sq. in.

Presents Clean Appearance

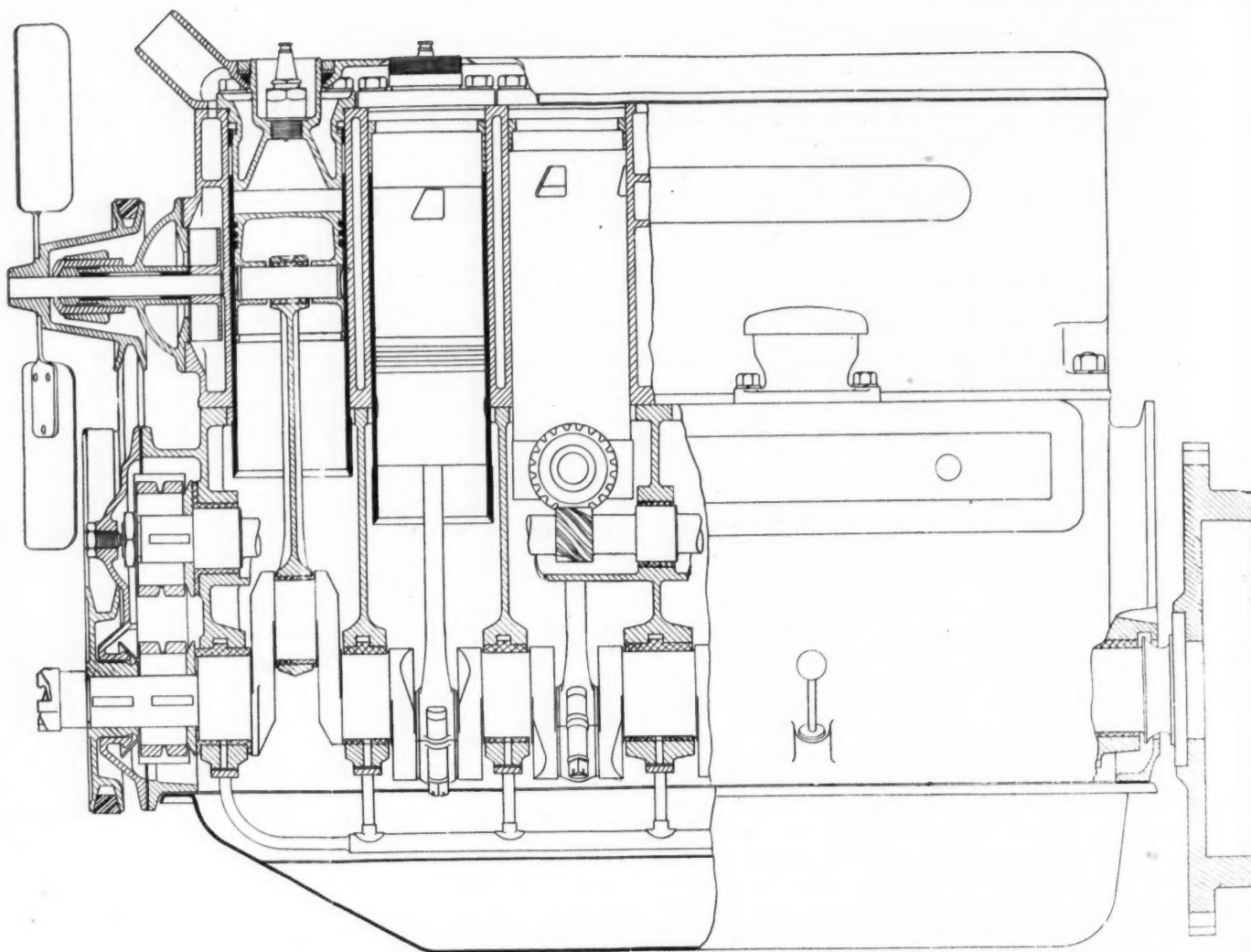
Owing to the carrying of the water jackets down to the top of the crankcase, the use of a one-piece aluminum cylinder head cover, and the elimination of valve chamber covers, the engine presents a very clean appearance. Recesses are provided in the cylinder block flange for the nuts holding it to the aluminum crankcase. The bottom flange of the case, to which the oil pan is attached, is carried 2 1/2 in. below the center line of the crankshaft.

Operation of the sleeves is the same as in other Burt-McCollum type engines described in previous issues of *Automotive Industries*. The crank, which runs at half engine speed, oscillates each sleeve 49 deg. and reciprocates it 1 1/4 in. vertically. The resultant path of any point on a sleeve is elliptical. Ports in the cylinder are uncovered by corresponding ports in the sleeve once in every two revolutions of the crankshaft.

While there are four ports in the cylinder—two exhausts and two inlet—there are only three ports in the sleeve. During the inlet stroke the middle port of the sleeve uncovers one of the two inlet ports and on the last stroke of the cycle it uncovers one of the two exhaust ports.

Oil spray from the crankshaft is depended on for lubricating the sleeves. As the oscillating motion tends to cause the oil to creep around the sleeve, it has been found unnecessary to provide oil grooves or holes in the latter. The temperature of that portion of the sleeve around the exhaust ports is kept down by the fact that this portion of the sleeve periodically moves toward the inlet port, where the temperature is lower. The sleeves, which are 9 15/16 in. long and of 3/32 in. wall thickness, are of cast iron and have both their inner and outer surfaces ground.

Operation of the sliding members is through a single universal driving connection of unusual design formed in the flange at the bottom of the sleeve. A special seat or socket is machined in the lug on the flange, and into this fits a case-hardened ball. By means of two extra machining operations, the ball can be inserted in the latter



Side elevation partly in section of the new Continental single sleeve valve engine

and then by rotating the ball to its normal position is permanently held in its proper place.

The crank on which the ball fits is formed integral with the cross-shaft carrying the worm wheel. The latter is of bronze, while the worm is of the FJ type. At the forward end the shaft is carried in a plain bronze bearing, which is set in the valve chamber casting, while at the other end it is held in a brass, babbitt-lined bearing. This bearing is bolted by four screws to the valve chamber and provides a very rigid support for the cross-shaft. The worm wheel is keyed to a special center which in turn is keyed to the cross-shaft in such a manner as to make it impossible to assemble the unit out of time with the crank. Between the wheel and the shaft proper is a worm wheel center which acts as a "make-up" piece so as to facilitate the meshing of the wheel with the worm on the valve-shaft in assembly. After the worm wheel and center piece are in place, a case hardened washer is slipped over the cross-shaft, and then all four pieces are firmly held together by tightening the nut on the end of the shaft. The ratio of the worm to the wheel is 2 to 1.

Each worm wheel is driven by a separate worm, formed integral on the four-bearing valve shaft. All worms are identical, as are the worm wheels. The entire sleeve operating mechanism, including the shaft and gearing is enclosed in the crankcase and runs in an oil trough which can be fed with lubricant from either end. An aluminum cover secured by three screws, fits over the ends of the sleeve operating shafts on the outside of the crankcase. Valve timing is as follows:

Inlet opens on T. D. C.; Inlet closes 30 deg. after B. D. C.

Exhaust opens 46 deg. before B. D. C.; Exhaust closes 10 deg. after T. D. C.

Firing order is 1-5-3-6-2-4.

The valve shaft bearings are brass bushings, babbitt-lined, and are of the following dimensions:

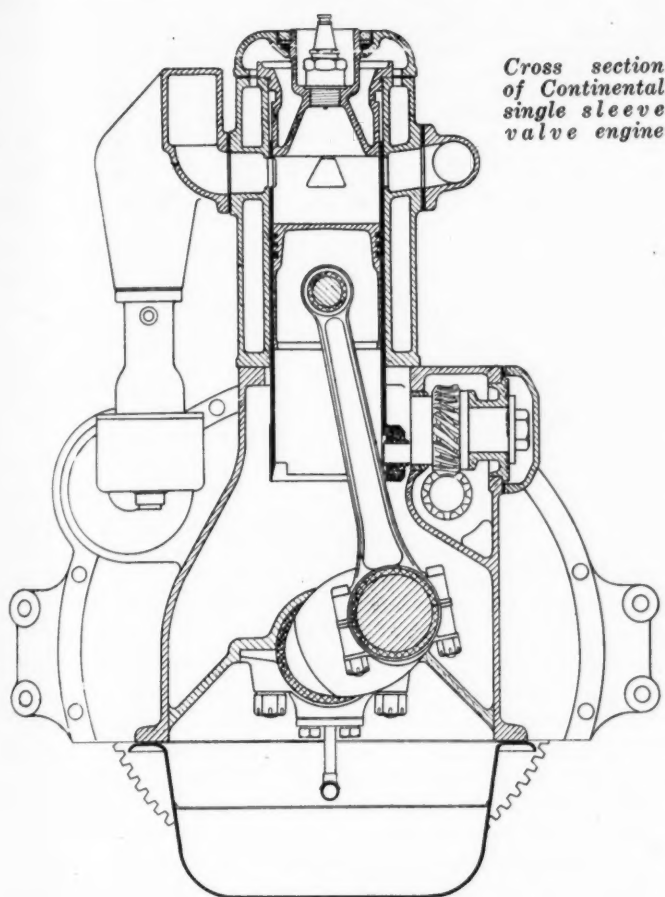
Front $1\frac{5}{8}$ in. by $1\frac{1}{4}$ in. long; 2nd $1\frac{9}{16}$ in. by 1 in. long; 3rd $1\frac{1}{2}$ in. by 1 in. long; Rear $1\frac{7}{16}$ in. by $1\frac{1}{4}$ in. long.

End thrust of the valve shaft is taken by a hardened washer on the flange of front bearing.

Chain Driven Valve Shaft

A Morse chain of $1\frac{1}{4}$ in. width drives the valve shaft from the crankshaft without change in speed. No other shafts are driven by this chain, and, therefore, no provisions for chain adjustment are made. A V belt drives the generator from a pulley on the front end of the crankshaft. Generator mounting is of the cradle type. From a double pulley on the generator another belt drives the combined fan and water pump unit.

Each cylinder has a separate head which is secured to the block by four screws. No rings are used on the cylinder heads. Both the cylinder wall and the head are ground and the sleeves are so dimensioned as to give a push fit. A paper gasket is inserted between the cylinder head flange and the top of the cylinder block. A small recess is formed above the sleeve when in its topmost position, the object being to reduce the air pressure created by the upward motion of the sleeve. The inside of the head (which is fully machined) is cone-shaped. This shape obviates the need for spark plugs of special form, special tools and adapters.



Cross section
of Continental
single sleeve
valve engine

Cooling water passes from the cylinder jacket to the head jacket. The impeller water pump, which is formed integral with the fan, has its shaft carried on two plain bronze bushings, and the entire unit is bolted to the front of the cylinder block. An aluminum water cover encloses the cylinder heads proper and is held down against a rubber gasket by ring nuts screwing on projections of the cylinder heads.

The crankshaft, which is drilled for oil feed to the connecting rod bearings, is carried in seven bearings of $2\frac{1}{4}$ in. diameter, of the following lengths: Front, $1\frac{7}{16}$ in.; intermediate, $1\frac{1}{4}$ in.; center and rear, $2\frac{1}{8}$ in. Both front and rear bearings are grooved and tapped so that the front bearing provides oil to lubricate the timing chain, while a constant supply of oil is maintained in the valve shaft trough from the rear main bearing. Through a hole drilled in the web of the case, oil is led to a nipple on the outside of the crank case, where connections are made to the pressure gage line. The crankshaft is machined all over and fully balanced. The gear oil pump is mounted outside the crankcase on the right. It is driven off the valve shaft from a point between cylinders Nos. 3 and 4.

9-in. Connecting Rods

Crankpin bearings are $2\frac{1}{8}$ in. in diameter by $1\frac{1}{8}$ in. long, while the center-to-center length of the connecting rod is 9 in. Piston pins are $\frac{7}{8}$ in. in diameter. The full floating type piston pin is retained by snap rings at both ends and bears directly on the bosses of the cast iron piston. The latter is $3\frac{7}{16}$ in. long with the pin center to top of head $1\frac{3}{8}$ in. Three rings are used, all above the pin, the lowest being a tester oil control ring of $\frac{3}{16}$ in. width and the other rings plain, of $\frac{1}{8}$ in. width.

The ignition distributor is driven off an extension of the cross-shaft of No. 2 cylinder by means of beveled gears

which are oiled by the overflow from the relief valve of the pump. When the valve shaft mechanism cover is removed, the ignition unit comes away with it. The starter has flange mounting on the right side of the engine and engages with the flywheel by an outboard Bendix drive. The engine is designed for four point suspension.

Copper-Tungsten Welding Electrodes

ONE of the limiting features in many resistance or spot welding operations has been the copper electrode used, pure copper not being hard enough when used under the high pressures at high currents common to this type of welding. Usually, after a few welds are made, the surface of the copper electrode in contact with the weld becomes hot enough to anneal the copper, thus making it very soft. As a result, the copper tip rolls and mushrooms over the edges, giving a large spot weld which changes the current density and, consequently, the quality of the weld.

To solve the problem growing out of this condition, the General Electric Co. has evolved a copper-tungsten alloy for the welding electrodes. Copper-tungsten, as the name implies, is composed of two metals, one a good electrical conductor, the other very hard. The alloy has a hardness of 225 Brinell, as compared with 82 for hard copper and 30 for soft copper. The compressive strength of copper-tungsten is 208,000 lb. per sq. in., as against 58,000 for hard copper. The tensile strength is 56,350 lb. per sq. in., as compared with 30,000 for soft copper and 50,000 to 70,000 for hard drawn copper.

Copper-tungsten does not anneal at red heat. Thus there is no soft surface metal to roll or mushroom over when used in resistance welding. It has not been found necessary to form the entire electrode point or die of copper-tungsten, and the alloy is used in the form of an insert. Either an oversize piece is forced into a hole in the die, a block is brazed into the wearing surface, or pieces are placed in a mold and the die is cast around them. The remainder of the die is made of copper, as before.

In view of the higher first cost of copper-tungsten, its chief value is expected to be in special applications. The material has been given the trade name Elkonite and will be manufactured and sold by the Elkon Werks, Inc., Weehawken, N. J., of P. R. Mallory & Company.

Shale Oil Possibilities

AT the public hearings held recently by the Federal Oil Conservation Board considerable more information was elicited as to the future supply and demand for petroleum products.

A statement in the paper by Karl J. Schuyler was that something over 108,000,000 barrels of oil could be produced from shale at an average cost, in projects of ten to fifty thousand barrels per day, of about \$1 per barrel. Comparison of this figure with the cost of well oil of \$2.50 to \$3.00 per barrel affords an interesting matter for speculation as to future oil producing activities. This prediction by Mr. Schuyler was based on the fact that there are estimated to be nearly 395,000,000,000 tons of oil shale in the United States. A considerable part of this shale is found above ground in easily workable open seams which may be as much as 50 ft. thick and from which as much as 120,000 barrels of oil to the acre may be obtained.

From careful studies made as to the cost of various mining operations and comparing these projects with that of oil shale mining Mr. Schuyler believes that 50 cents per barrel would amply cover total mining costs and if this were true total costs would not exceed \$1 per barrel.

F.O.B. Prices vs. A.Y.D.

General adoption of system put into effect by Hudson seems unlikely in near future. Some executives, however, view plan with considerable favor.

By Norman G. Shidle

ABOLITION of f.o.b. factory prices and institution of zone delivered prices for passenger cars by a number of companies is within the realm of possibility, but is not probable in the near future. Accurate predictions along this line are almost impossible because any general moves by the industry depend so much upon action by a few companies. With one important company already operating on the zone delivered price basis, similar action by two or three other prominent manufacturers might result in a widespread swing toward that method of pricing cars. But there is little to indicate that two or three more important companies will make any such move.

A large number of factory executives have been studying the zone delivered price—or "at your door" price, as Hudson calls it—quite carefully in recent weeks. Several organizations, as a matter of fact, had talked over the possibilities of a.y.d. prices and had laid out tentative plans for putting them into operation many months ago, one company at least having got into the matter rather carefully over a year ago. So thoughts about a.y.d. prices are not entirely new to the industry, although the Hudson move of a few weeks ago undoubtedly has concentrated attention on this phase of merchandising policy at this time.

No single general statement can be made which will cover the attitude of the various car companies on this point. Definite opposition to such a move exists in a few places and the official attitude of most companies is against the a.y.d. idea at the present moment. A good many important executives look upon the plan with considerable favor, however, from a personal standpoint, although they are not yet thoroughly convinced that it should be adopted by their own organizations.

Thinking Much, Saying Little

While the adoption of a.y.d. prices in any case would mean a basic change of permanent policy, it is almost certain that the possibilities of immediate merchandising advantages or disadvantages will weigh heavily in determining any moves which may be made on this question in the near future. Some factory men who favor the a.y.d. plan in a general way believe that its institution at this time would hurt rather than help their marketing activities and for that reason are thinking a good bit and saying very little.

Others are definitely opposed to the a.y.d. plan fundamentally, believing it to be unsound from an automotive merchandising standpoint.

Among the chief reasons advanced in support of the

a.y.d. plan from the standpoint of the manufacturer are the following:

1. It makes possible delivery of the car to the owner at the lowest possible price, because it enables the factory practically to control the maximum charge which the dealer shall make for the vehicle delivered at the customer's door. Thus unfair additions to price in the way of excess "handling charges," etc., are made difficult if not impossible.

2. It is psychologically sound, because the prospective buyer wants to read in an advertisement the price he will have to pay for a car—not the price it would cost at the factory.

3. It tends to simplify some phases of internal record-keeping and administration.

Objectors to the a.y.d. system see in it the following unfavorable qualities:

1. With zone delivered prices it is very difficult to handle prices on various zone borders. If there is a \$15 or \$20 difference in price on a given car at two points only a few miles distance—as seems bound to be the case where zone lines cut through—an impetus is given to car bootlegging, and selling for the dealer whose price is higher is made quite difficult.

2. By lumping all charges under a delivered price, an opportunity is given for unduly padding the price of the car.

3. On the other hand, the delivered price may be so small as to make dealer operations very difficult; that is, the spread between the price which the dealer pays for the car and that at which he can sell it may not be large enough to include necessary handling and conditioning charges which, in that case, would come out of his regular discount. At present most dealers add such a charge to the freight and tax. This is necessary in view of the low margin of profit at which the dealer already is operating in most cases.

Little intelligent discussion of certain phases of the question can take place unless the exact amount of spread between the price the dealer pays for the car and the a.y.d. price in a given case be involved. The size of that spread determines the desirability of the particular a.y.d. plan from the standpoint of the car purchaser or from the standpoint of the dealer.

A good many dealers are inclined to oppose the a.y.d. plan because of a feeling that in operation it would be likely to be worked out in such a way as to decrease the

margin existing at present; that one of the chief purposes of the factories in installing the plan would be to cut down on some of the "handling charges" now commonly added. If a sufficient margin were allowed, however, little opposition would be likely to arise on the part of many dealers. Mutual agreement as to what constituted a "satisfactory margin" would be one of the problems to be worked out in connection with the installation of an a.y.d. plan. The factory, of course, having determined what it considered a fair margin, much of the argument might end there, yet a majority of sales managers today feel strongly the desirability of coming to reasonable agreement with their retailers on such questions.

Factories Fix Handling Charge

What amounts to an unadvertised zone delivered price already is in vogue in a number of car marketing plans. Many factories already specify an amount which the dealer may add for handling charges to the f.o.b. factory price in addition to freight and war tax; in certain instances this sum is said to be specified in the contract which the dealer signs. This results, theoretically at least, in the customer receiving the car at the price which the factory considers to be the lowest possible in reasonable fairness to the dealer.

Several factories which do specify such a handling charge to their dealers admit considerable difficulty in getting the retailers to hold to that minimum. Field men and others constantly check the dealers up in this respect and bring about conformity when violations are found—and they often are found, "additions of \$5 to \$100 being rather common," according to one important factory sales manager. Some other factories report more success in controlling their dealers on this score, but some difficulties undoubtedly are experienced all along the line. It is this fact which influences a number of factory men favorably toward the a.y.d. plan, even though its disadvantages make them oppose its adoption.

One example of a modified a.y.d. plan is found in the policy which the Chevrolet Motor Co. has been practising recently. This company has been placing newspaper advertising in certain cities announcing the f.o.b. prices of its different models and then quoting in parallel columns the cash delivered prices and also the delivered prices for time sales, where a finance charge is added. At the bottom of such an advertisement appearing in any particular city is usually appended a list of Chevrolet dealers in that city, indicating that they have subscribed to the prices quoted. In numerous other cases, car dealers, representing various makes, take it upon themselves to quote the delivered or a.y.d. prices of their cars in local advertising.

Both Use Same Argument

It is interesting to note that antagonists and proponents of the a.y.d. plan often bring up the same argument in favor of their opposing views. Advocates of the plan, for example, say that since the factory always is interested in retail delivery at the lowest possible price, the buyer is protected from extra charges. Under the f.o.b. system, they claim, only a certified public accountant could figure out exactly what he really is paying for in the difference between the f.o.b. and the delivered price.

Opponents of the a.y.d. plan, on the other hand, say that it offers possibilities for concealed charges, that the f.o.b. plan is the only one which enables the purchaser to determine exactly what he is paying for. He knows the f.o.b. price, they point out, then he can easily learn from the dealer the specific charges for freight, war tax, handling, insurance and financing.

All of which confirms a point made previously, that the actual spread between the price the dealer pays and the price at which he sells is the important thing in any a.y.d. plan; again, as in other phases of automotive marketing, the method of operation has more effect on the result than the type of plan employed.

Through the whole study of the a.y.d. plan possibilities runs the thought of a possible flat sales price for the country as the ultimate outcome of moves in this direction. The flat price idea has more than one important sympathizer at the factories, although every executive to whom we talked in a recent swing through the Detroit district recognized very clearly the one outstanding objection to the flat price plan. That objection, of course, is that the purchaser located near the factory must pay a higher rate than he otherwise would; he must bear some of the burden of the lower price which would be possible for purchasers at distant points.

The simplification of accounting and handling of operations and the fact that many other manufactured articles are bought on a flat price basis, however, are urged as prime factors in favor of a flat price for the entire country. "If we never had had f.o.b. prices and sold on a basis of f.o.b. plus freight," one executive said, "it would be easy to have a flat price for the country. Nearly every other manufactured product bought by individuals is sold on a flat price for the country or at least with only two prices—one for East of the Mississippi and one for West of the Mississippi. We buy hundreds of articles on that basis every week and think nothing of it at all. Why not sell automobiles on the same basis?"

Another factory man, who does not believe in the flat price idea, answered this question by pointing out that the freight charge on automobiles is much heavier than on any other manufactured articles bought by individuals and sold on a flat price basis. On account of the size of the automobile and the consequent size of the freight bill involved, the injustice to the buyer near the factory would be greater than in other cases. He pointed out, also, the extreme difficulty of making any such change in automotive merchandising practice after car sales had been built up on the f.o.b. plus freight system for so long a period of years.

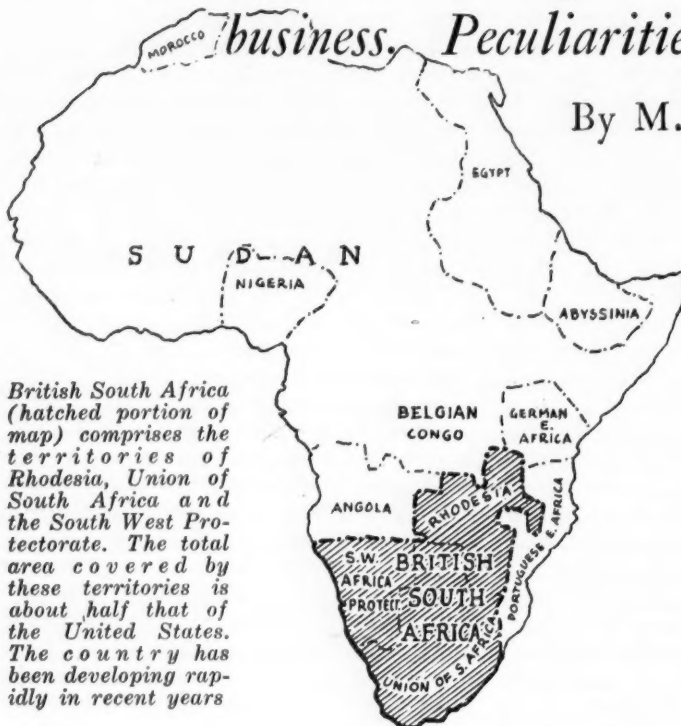
So far as the flat price idea is concerned, however, there seems to be little possibility of its getting more than speculative consideration from any manufacturers for a very long while to come. It is not within the realm of current possibilities so far as can be determined at present. Discussion of it, however, is an inevitable corollary of the immediate interest in a.y.d. zone prices.

TECHNICAL paper No. 346 of the Department of Commerce deals with Properties of Typical Crude Oils from the Producing Fields of the Western Hemisphere, the authors being A. J. Kraemer and L. P. Calkin. The Bureau of Mines, which is a section of the Department of Commerce, has been engaged in a survey of typical crude oils from the producing fields of the United States, and the results of this survey have been previously published. The technical paper mentioned above is the first publication of the Bureau dealing with the properties of crudes from fields outside the U. S. The Bureau undertook a study of foreign crudes for two reasons: First, foreign fields are potential sources of supply for the United States; in fact, considerable quantities of some foreign crudes have been imported already. Second, the oils are very similar in physical and chemical properties to oils found in the United States, and a study of the resemblances has scientific value.

South Africa Good Potential

Bus use is increasing. U. S. manufacturers can get business. Peculiarities of country described.

By M. Edward



British South Africa (hatched portion of map) comprises the territories of Rhodesia, Union of South Africa and the South West Protectorate. The total area covered by these territories is about half that of the United States. The country has been developing rapidly in recent years

THIS article is based on personal observations over a period of years and should prove of very definite value to American bus manufacturers contemplating a sales campaign in the South African market. M. Edward is located in the territory and is thoroughly conversant with automotive market conditions there.

British South Africa is importing motor vehicles in constantly increasing volume, and has always been very partial toward American makes. The most important section of the territory is the Union of South Africa, which imported passenger cars valued at £1,530,060 during the first six months of 1925, as against £1,345,857 for the same period in 1924.

Mr. Edward sees signs of heavy bus importations this year.

DOWN on the southern tip of the great continent of Africa is a vast dominion almost half as large as the United States in area—British South Africa. American manufacturers of motor bus chassis who are searching for new markets will do well to study the possibilities of this field.

American buses are represented in South Africa at the present time by only a very few makes, although the total number of vehicles exceeds those from any other country. Most of the American bus chassis are known by name only, but details of them are eagerly studied by operators when available. British bus chassis are becoming known and manufacturers are endeavoring to get a foothold in the fast-developing field. American makes, however, stand an excellent chance of predominating as greatly as do other types of American built motor vehicles in their fields in South Africa, provided attention is given to the requirements of the country in this, the early stage of the game.

As a matter of fact, American bus chassis are generally looked upon more favorably than those from other countries and care should be taken to see that this continues to be the case. French and Italian factories are turning out chassis that are proving successful in operation in South Africa, and it is likely that they will continue to get a share of the business. The bulk of the business that

is developing, however, remains for the American manufacturer if he will take the opportunity to strengthen the foundation which has already been laid.

The number of buses in use in British South Africa at the present time is estimated at under 500—a very small drop in the ocean of possibility.

After deciding that business is wanted in this territory, now in the process of its development, the American bus chassis manufacturer will want to know the best way of handling the sales side of the business—the type of dis-



Bus bodies on truck chassis are still seen in certain parts of South Africa, although specially designed chassis and bodies of the modern type are rapidly coming into general use

Market for American Buses



Buses of modern American design in Johannesburg, Union of South Africa. The bodies were built locally. Johannesburg is planning a number of municipal bus lines and may be in the market this year for a good-sized fleet

tributors or dealers to appoint, and the competition to be combated in regard to the makes of buses at present represented and in use. Naturally, a trip to the country by a factory representative would be the ideal way to make a start. Knowledge of the territory is essential, for conditions are very different from those in older countries with denser populations and smaller distances. Failing a journey overseas, information should be sought from the most reliable sources, and the experiences of other manufacturers already in the field should be taken advantage of whenever possible.

The operation of motor buses in South African cities and towns is just emerging from the jitney stage—where the operators were in America some three or four years ago. Bitter wars between privately-operated buses and municipal street-car systems are being waged and great care has to be taken by dealers in their merchandising, for the business is by no means in a healthy condition. Bus chassis are demanded on terms, and in many instances the dealer or distributor has to finance the body-building as well in order to sell the vehicles.

It must be mentioned here that it is of little use to try and introduce motor bus chassis complete with bodies into South Africa, as there is a protective tariff aiding the body-building industry. The industry has got to the stage where excellent bodies are turned out at costs that compare favorably with those in America, besides which the types are suited to local conditions. As the bodies are built in South Africa it will not be necessary to go into the question of types and seating arrangements in this article.

Whereas in the truck field the mistake has been made in the past of trying to sell chassis of too great capacity, practically the opposite holds good in the bus field. Great harm has been done to the bus industry in cities like Johannesburg, Cape Town, Pretoria and Port Elizabeth by the building of bodies of greater capacity than the chassis could handle. Twenty and twenty-two passenger bodies are quite commonly supplied even now on the $1\frac{1}{4}$ ton chassis of a certain well-known American make—with the inevitable results. In America you have gone through your overloading period, and I understand that manufacturers and dealers are careful about the use of bodies which carry more passengers than the chassis can take care of. The wisdom of this is now realized in South Africa and the trend is toward larger capacity chassis than are at present in use.

The thirty-passenger bus is considered by many to be the best type for city and interurban use and a 3 to 4-ton chassis is therefore necessary to take care of a long single-deck body. Double-deckers are not used in South Africa although, curiously enough, most of the street-cars are of that type. The bodies built are a little on the light side, this being due to the endeavor to mitigate the overloading of the chassis now generally in use. Many of the chassis taking care of from twenty to twenty-five passengers should have only from 14 to 18-seater bodies on them in order to function economically.

Severe losses to operators have resulted in the need for education regarding the standard of chassis required, and in this respect it must be said that South Africa bus dealers have not up to the present done their part. The manufacturer about to start out for his share of the rapidly growing bus business in South Africa should bear this important fact in mind. He will have to get representation through car dealers, and it should be part of his early campaign to stress the importance of not permitting operators or body-builders to overload the chassis.

The country has emerged from the stage where any truck chassis is considered suitable for bus work, and the special bus job will appeal—and is appealing. It is a bit early to expect government, municipal or private operators to take up costly types of chassis such as six-wheelers. What is wanted is a plain and straightforward job with a four or six-cylinder engine—the latter for preference—that will give ample power for high speed and good hill-climbing. In the cities there are many severe hills and high average speed is expected by passengers who have been educated to this through very well operated street-car systems. The gearing should not be too high, and four forward gears will give a sales advantage over buses equipped with three.

A low type of chassis is liked, but it must provide good clearance, for some suburban roads are extremely bad. The gravest fault is that of a power-plant unable to take care of the gradients, which are generally not above one in eleven. Gasoline is costly—from 55 to 80 cents a gallon, and economy is therefore essential. The chassis should not be under-tired, for many evils have resulted from this. Dual rear wheel equipment is looked upon favorably for the larger jobs, pneumatics being generally used. Super-power buses are not likely to become popular because of high operating costs. Braking is important.

Because high speed is demanded, manufacturers should give definite information to dealers regarding the matter. The speed above which a bus must not be operated should be clearly indicated and in some cases it will be advisable to supply governors as original equipment. If possible, a check-up regarding the points of overloading and speed should be made periodically by the manufacturer, who will find reputable dealers ready to aid him in this.

It will be necessary to get representation through car dealers if possible, because of service facilities. In a country where the towns are so widely separated it is essential to see that stocks of spares are maintained in all centers, and this can be done only by making use of organizations that have been created through the sale of cars. It would not be practicable to endeavor to create a service organization for buses alone. Use should be made of all existing facilities.

This type of representation will be able efficiently to take care of the country demand for buses—a demand that is at present more potential than actual. Most of the buses in use for long regular runs are operated by the Government Railways. This organization has a fleet of approximately 100 vehicles which, it is understood, is to be added to soon. This fleet takes care of routes operated in country districts over dirt roads and under difficult conditions. Freight is carried as well as passen-

gers, but owing to the comparatively small total weight and a seating capacity providing for only about eight or ten passengers, a light type of chassis is giving satisfactory service.

For country work, in fact, a lighter type of chassis will be used for some time to come, but eventually the passenger-carrying demands will increase. A demand for a light type of vehicle also exists in the country hotel field where ordinary touring cars are for the most part being used.

The year 1926 will show a demand for buses of medium capacity by the municipalities of several inland towns and cities including Johannesburg, Pretoria, Bloemfontein, Boksburg, Benoni, Springs and many smaller places. In Capetown, Port Elizabeth and East London, street car operating companies are showing a tendency to go in for buses to take care of rush-hour traffic and instead of existing tracks.

In Durban, the municipally-owned street cars are receiving aid from buses and many more may soon be needed. Pretoria municipality has the largest fleet, and Johannesburg municipality is likely to purchase 20 or more bus chassis this year. If this municipality does start a bus fleet it will be the nucleus of a big one running, perhaps, into the hundreds. There are many privately-owned buses in operation in Johannesburg now.

Smaller Frame Members Used in Weymann Bodies

THE dimensions of the wood frame members forming the carcass of Weymann flexible fabric leather bodies have been reduced from 1.57 by 1.96 in. to 1 by 1.75 in., thus effecting a saving of about 8 per cent on the total weight of the body and at the same time reducing the area of blind spots.

This change has been decided on as the result of experience gained with special competition and semi-racing types of cars habitually driven at high speed for long distances over rough French roads. It has been found, owing doubtless to the reduced inertia forces, that these light bodies stand up better than the heavier models.

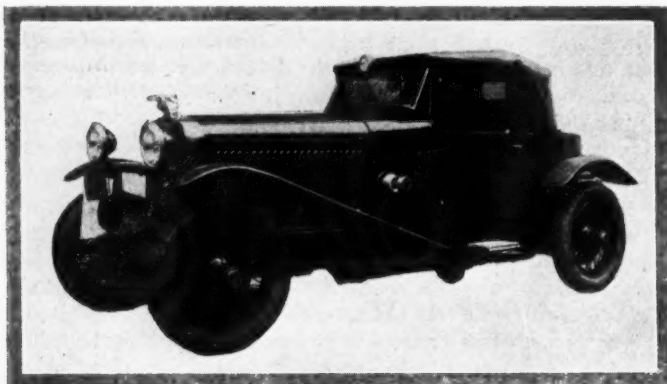
PYROXYLIN paint is being used very successfully over fabric leathers by the C. T. Weymann Company, the result being a finish which cannot be detected from a wood or metal body except by feel. A special sporting cabriolet on these lines just produced by Weymann

and metal parts are pyroxylin painted, but while the hood and the fenders are polished the fabric leather does not receive any special treatment. By the use of a highly polished leather, however, a brilliant luster is secured.

Apart from the light frame work, some of the features of this automobile are the use of three individual basket-work chairs mounted on rails with fore and aft adjustment. The basketwork is yellow, with black upholstery, so as to maintain the same color scheme inside as outside the car. The windscreen is in one piece, hinged along its top edge and having attachment from the center of its lower edge to the cowl by means of a screw and nut, thus making it possible to adjust it and positively lock it at any angle.

The valances between the fenders and the chassis in front and the body at the rear are in a special type of non-flammable celluloid, which has the advantage of allowing the driver to see his front wheels while driving and also giving a light appearance to the car. Held down along each edge by wood beading, it is found that there is no tendency for this material to split.

All baggage is carried in the pointed tail of the car, being laid directly on the floor boards and held in position by strapping to rails screwed to the body skeleton. The two spare wheels are carried in wells on the front fenders. An aluminum step before each door takes the place of running boards. The car has dipping headlights and a spotlight mounted centrally above the windscreen. The chassis is a sporting type of six cylinder Hispano-Suiza and is declared to have a maximum speed of 95 miles an hour.



Weymann body mounted on a six cylinder Hispano-Suiza chassis. Note the transparent valance, spare tire mount and rear fender

to the order of an English sportsman has a bright yellow body with black lining, with black for the folding top and for the windscreen supports. Both fabric leather

THE number of motor propelled passenger cars and buses in Prague increased from 2854 in 1924 to 3666 in 1925. Most of the cars in use are of domestic production, including the makes of Praga, Laurin-Klement, Tatra and Walter. Of foreign makes Fiat is in the lead, followed by Ford, but most of the Ford cars are commercial vehicles.

Just Among Ourselves

Railroad Increases Earnings—Still Kicks

THE annual statement of the West Jersey and Seashore Railroad has been released by the Pennsylvania System and contains comments regarding the decrease in passenger travel during 1925. Development of bus lines is given as the reason for decreased rail line patronage and the company laments that this development has been furthered by the rapid expansion of highway construction for which a large portion of the railroads' heavy taxes is used. Possibly the most interesting thing about the statement, but which must have been overlooked when the above comments were written, is that although less passengers were carried during 1925 than during any year since 1916, revenue from passenger traffic increased. The reason given for this is that the inroads made by bus lines were mostly in short haul traffic which is usually unprofitable to the railroad. So we have the curious condition of a railroad bemoaning the presence of an agency which apparently permitted the road to operate at a greater profit. And this, of course, is in addition to the oft demonstrated fact that motor vehicles are paying for highways upon which they operate.

Factory Views Vary on Used Car Problem

THERE are wide differences in the amount and effectiveness of used car activity on the part of various car manufacturers today. Some makers are focusing very serious attention and are concentrating very intensive efforts on the used car situation and are doing everything they can think of through special used car field representatives, regular bulletins and active cooperation to help dealers get rapid turnover on used car stocks. Other factories, while interested in the problem

and willing to help dealers, see the used car as primarily a dealer's problem and are carrying on few special activities to urge dealers to greater efforts in moving used cars. On no phase of factory merchandising is there wider difference of attitude among different factories at the present time.

* * *

Used Car Stocks High; Sales Fairly Good

USED car stocks are high in many lines, but the rate of sales also is fairly rapid in a good many cases. A number of prominent sales executives who have been traveling about the country and looking with particular care at this part of the sales picture are convinced that the used car situation is going to get worse before it gets better. Others, to be sure, see no special shoals ahead. The rate of factory production in the next four weeks probably will tell the story. At any rate, it is certain that the used car is getting more factory attention than at any time in the past, and that its share of the factory limelight is going to increase rather than grow less.

* * *

Match Interests in Peru Frown on Cigar Lighters

IT looks as though car-driving smokers of Peru will have to light up before they start out or travel without the soothing company of Lady Nicotine. The difficulty of lighting a match and keeping it lighted for any useful period of time while driving a car is too well known to need any supporting data. Catering to this very prevalent human frailty, a number of manufacturers have developed lighters which are proof against any and all of the elements. But, according to the Automotive Division, Department of Commerce, Peruvians are not to be permitted to enjoy such a luxury at will. The company

which holds the match monopoly in that country insists that any car makers who wish to equip with cigar lighters their products intended for export to Peru make special arrangements for such a step. What will be the result of an attempt to obtain permission to so equip cars is not known but the Division announces that no automobiles bearing cigar lighters should be shipped to Peru.

* * *

Irvin Cobb on the Etiquette of Motoring

SPEAKING of smoking brings the subject of etiquette to mind since that well-known authority on the sort of tobaccos that our granddads smoked, Irvin S. Cobb, has challenged Miss Emily Post's position as mentor of what to do and when to do it. Mr. Cobb confines his efforts to the correct procedure for the person behind the wheel of a motor car and the person who walks in front of it but this limitation expands the number of persons who may learn etiquette from him to include all able-bodied citizens of the country. "Much Obligated" expresses the spirit which should pervade our motoring manners, says Mr. Cobb, and he has given that title to an essay on the subject which has been published by The B. F. Goodrich Rubber Co. A few hours experience on the highway will convince the most skeptical that motoring manners have never been properly codified and explained to the motoring public. The particular style which Mr. Cobb uses should be very helpful in getting his message across to his readers and the illustrations by Tony Sarg with which some of the more important points are emphasized also will add to the effectiveness of the work. The basis for this code of motoring manners is the same as that used for all other codes of manners or ethics—the Golden Rule.—N. G. S.

Removable Cylinders Simplify Maintenance of Air-Cooled Airplane Engines

Cylinders may be removed singly for overhauls if desired. Parts replacement cost varies from 5 to 7 per cent of the initial cost of engine per 100 hours of actual operation.

By Archibald Black

Consulting Air Transport Engineer

THE modern air-cooled engine, although its outward appearance may not always show it, is in a class very different from the older engines of this type. Time was when the air-cooled engine was looked upon with something akin to suspicion by the operator to whom maintenance costs carried interest.

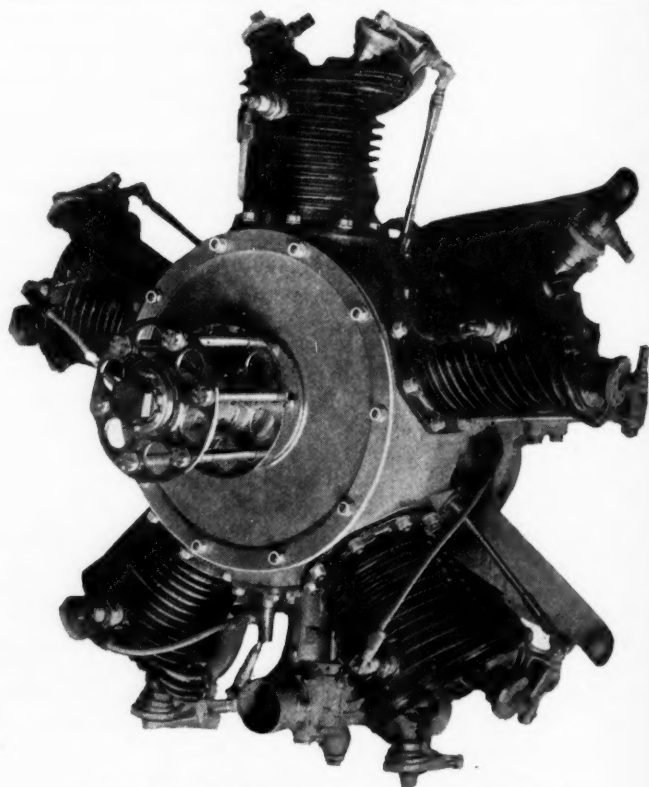
In the early days of aviation the rotary types of air-cooled engines were in quite general use but they were accepted as one might accept temperamental "prima donnas." In civil activities they were tolerated for a time but they were displaced just as soon as the development of the water-cooled type made this possible. However, instead of air-cooled engine development being dropped, efforts were concentrated largely upon the stationary radial type. During recent years the results of this work have become evident in the return of the air-cooled engine to favor among commercial operators. For the modern air-cooled engine ranks with the best of the water-cooled

types and it has the advantage of eliminating the water cooling system—a prolific source of trouble in service.

This return to popularity of the air-cooled type suggested to the writer the advisability of making a thorough study of its maintenance costs. Carried out during the



The Wright "Whirlwind" 200 hp. engine



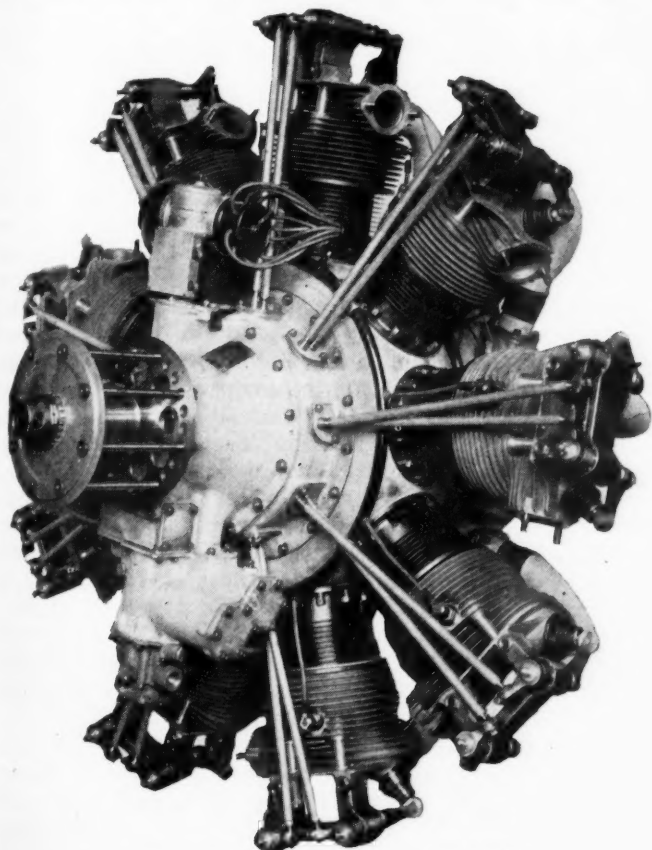
The Detroit Aircraft Engine Works' 60-70 hp. "Beaver" or Rickenbacker model

last few months of 1925 and the first few of this year, the work has just been brought to a close.

When the problem of obtaining information on the cost of maintaining air-cooled engines came up we were faced with the fact that most experience had been obtained with the older types. From these older types we could learn little or nothing about the cost of maintaining the more modern ones. With the latter only a very few operators had sufficient experience to furnish information of tangible value and even their knowledge was rather limited on the point of engine life.

However, it was found possible to collect and compile a valuable fund of information on the life of engine parts, labor required for overhauls, changing of engines and similar work. Through cooperation of some of the manufacturers it was possible to obtain information upon the cost of such parts as would necessitate replacement in the various overhauls. This information, having been collected within the past several months, may be regarded as strictly up-to-date in its application to modern American engines and operating conditions.

Among those who were particularly helpful in furnishing information on maintenance, operating conditions,

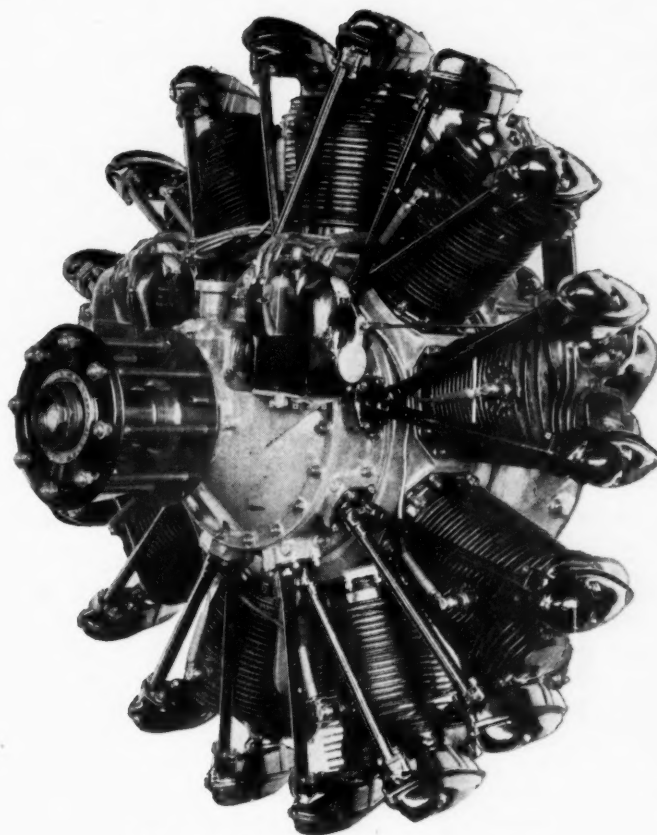


The Curtiss 400 hp. model R-1454

life of parts and their cost were several officers in the U. S. Air Services, some civil operators, a number of those connected with manufacturers, some regrinding firms and a few others.

Several hundred modern American fixed radial air-cooled engines are at present in use but it was found particularly difficult to obtain exact data on the actual life of these because of their scattered duty and because few have yet been run to their limit of usefulness. Several estimates were obtained which appeared reasonable but which, under the circumstances, could not be considered final.

Fortunately, we have a fund of data on the operation of water-cooled engines under similar conditions and this information can be used as a check upon the air-cooled engine estimates. There are also many factors to be taken into consideration. The difference in life of various makes and types is extremely marked and cost estimates must take this into consideration. Just now constant improvement is being made in "active" models and the limit of useful life is constantly being pushed further up. Digesting the information compiled, it would appear that a useful life of around 1000 hours can be considered a reasonable expectation for a high grade engine in average commercial service if the cylinders, crankshaft and possibly some



The Wright "Simoon" 325 hp. engine

other bearings are to be reground in service. This, of course, does not include allowance for engines lost in accidents, as these should be accounted for separately. Naturally this figure will vary also with the type of service to which the engine is to be put. This figure, however, is intended to apply to the average commercial condition and is reasonably conservative.

If parts are not to be reground in service use it will be necessary to reduce the estimate of life to 500 hours, but it is far more economical to figure upon regrinding as the regular practice. At first impression the 1000 hours of service may seem low to those not familiar with the service rendered by an aviation engine in this period. Assuming a scheduled speed of 100 miles per hour it would have covered a total of 100,000 miles. This is about the distance which the average automobile would cover in 15 years.

Parts Replacements Increase

As the hours of use roll up with each succeeding overhaul the parts replacements increase. Customary practice has been to remove an engine from service and to salvage all parts after a certain amount of replacement of parts becomes necessary. The figures given above are on this basis because of its fairly general acceptance and because it provides a very convenient method of calculating cost in estimate work. However, the life of engine parts has now been brought to the point where some manufacturers are considering the possibility of obtaining "infinite" life through continued replacement of worn parts. Investigation seems to indicate that this policy may become practicable with at least some models.

If the parts replacement policy is continued beyond the customary limit the studies of one manufacturer suggested that the parts cost would finally reach a point where it became a constant. This is not so radical an idea as might appear nor is the possibility of gain so great as it may seem. As all usable parts are salvaged and used over

again when an engine is withdrawn from service, the withdrawal consists chiefly of the removal of an engine serial number from the records. In any case the question of obsolescence must be taken into consideration.

Aviation engine design and requirements change gradually and provision must be made for eventual replacement of all engines by later models. The figures on working life and salvage value discussed in this article are intended to include allowance for this element; if other methods are used it must be taken care of separately. In all cases it is desirable that the operator be equipped with the latest models of engines. Hence he will find it the best practice, from every viewpoint, to limit his engine purchases to no more than actual requirements including necessary reserves. Following up this policy, every effort should be made to get the maximum use out of his engines in the minimum period of time. In this manner he will constantly be in the market for later models and his equipment will always be of the latest type.

Time Between Overhauls

The matter of time between overhauls was another point taken up and several different estimates were obtained from experienced operators. A few of the high points in the collected information deserve special mention. During the recent Australian cruise of the U. S. Navy, two air-cooled engines (of the general type considered) were operated over 275 hours without overhaul. Some 20 more ran over 200 hours and the remaining 20 ran over 150 hours without overhaul. No loss of r. p. m. was recorded during these periods nor did the engines give any other indication of requiring more than routine attention. The experience of Huff, Daland Dusters, Inc., operating about 14 engines under severe conditions and heavy load, suggested the desirability of scheduling overhauls every 150 hours in their case. From this and the other information compiled, it would appear good practice to regard 150 hours as the proper time between scheduled overhauls for severe operating conditions and possibly as high as 200 hours for really favorable conditions.

Usually it will be practicable to alternate between "top" overhauls and complete overhauls, the custom adopted being governed largely by operating conditions and the fixed periods between overhauls. These figures compare very favorably with experience on water-cooled engines.

The stationary radial type of air-cooled engine has a few important advantages over the water-cooled type which might be noted here. One of these, of course, lies in the elimination of the water-cooling system which experience has shown to be a frequent cause of trouble. Another is found in the accessibility of the radial cylinders which permits removal and replacement of cylinders, grinding of valves, etc., with the minimum of work and without removing the engine from the airplane. This last feature is worthy of careful consideration as it will permit most of the overhaul work to be done "piecemeal" between flights and will often eliminate a spare engine which would otherwise be necessary for substitution during overhauls.

For a typical American stationary radial air-cooled engine of around 200 hp., several estimates of overhauls labor were obtained. From these it became possible to provide some estimate figures which should be applicable to the average condition. In operations where the volume of work permits efficient utilization of labor, the time for complete overhauls might be estimated as low as 100 man-hours. On the other hand, for small scale operations, it might be found necessary to allow 125 or even as much as 150-man hours for this work. Top overhauls may be assumed to vary from 20 to 25 man-hours for similar conditions.

In compiling estimates of labor required in engine maintenance work the comments just made regarding volume of work, experience of overhauls crews and other conditions must be taken into consideration. Many of these factors have an important bearing upon time required to complete an overhaul.

A very thorough study was made of the cost of parts replaced during overhauls. Starting with a table of the estimated life of parts a detailed schedule of replacements for each overhaul was worked out. The approximate cost of parts was obtained and tables of parts replacement costs developed. In the present stage of engine development the life of parts is constantly being increased; hence the tables are not included here as it seems rather early to place them on record.

As might be expected, the estimates indicate a gradual increase in the cost of parts to be replaced with each succeeding overhaul which included regrinding and which practically gave the engine a new lease of life. These estimates indicated that the average cost of parts replaced during the life of the engine would be around \$3.60 per hour of use. A similar estimate, prepared by one of the manufacturers and somewhat more complete, indicated about \$2.40 per hour. It would seem reasonable to regard the two figures as indicating the probable range of this charge. In general then, the parts replacement charges may be expected to range between about 5 per cent and 7 per cent of the initial cost of the engine for each 100 hours of use. This checks fairly well with some information compiled previously by the writer* for Liberty-12 and similar water-cooled engines. It happens that the water-cooled engine parts worked out at a slightly higher rate (being 8.4 per cent) but the difference may be accounted for by the characteristics of the two types of engines. In any case it is almost within the range of error possible through our present limited information on aviation engine maintenance.

Transfer of Engines

The total time involved in a complete transfer of engines of the fixed radial air-cooled type has been estimated as ranging from 10 to 20 man-hours. This estimate allows for removal and replacement of propeller, cowling, etc. While the work can be done by two men, it is advisable to have three available and, in any case, proper facilities for lifting engines out of and into place should be provided. Generally, an ordinary chain tackle suspended from the roof truss, or from a portable frame, is satisfactory for this purpose. Practically no material is required in connection with transfer of air-cooled engines apart from the gasoline and oil consumed in the short test run after the new engine is installed.

The fixed radial air-cooled engine usually requires a little more careful daily inspection than the water-cooled type but, on the other hand, its accessibility makes this a very simple operation. The time required to make such inspection, and to do some miscellaneous work such as greasing of push rods, is slight. As a matter of fact it can be assumed as included in the time ordinarily allowed for the routine daily inspection of the airplane and engine.

On account of the facility with which cylinders of fixed radial engines can be removed, a departure from the accepted water-cooled engine maintenance practice is justified. Customary water-cooled engine practice calls for removal of the engine for a complete overhaul every 100 to 150 hours. With the type of engine being considered, as previously suggested, this may be modified and the cylinders removed one, two or three at a time without remov-

* "\$10,000 Airplane Engine Depreciates \$10.60 per Hour of Service."—Automotive Industries, Sept. 10, 1925.

ing the engine from the airplane or interfering with many other parts of the engine. The work may be scheduled so that every cylinder is given a "top" overhaul after about 150 hours of use and the engine may be removed from the airplane for a complete overhaul after another similar period.

The labor cost with this method will work out about the same as, or slightly less than, if the engine was removed and given a complete overhaul every 200 hours. The parts replacement charges will be differently distributed but the replacement cost per hour of operation will remain about the same. The chief advantage of this system lies in the fact that the engines are kept in constant service for about 300 hours while their condition is maintained up to practically the same standard as if they were removed and completely overhauled after every 150 hours of use.

Salvage Values Hard to Fix

Only one of the many individuals consulted was willing to commit himself as to the salvage value of an engine withdrawn from service. It happens that, just at this time, any figures on the salvage value of modern airplanes are necessarily little more than intelligent guesses. Most operators seem to lean too far on the conservative side in fixing salvage values. There is more to be learned from study of the life of parts than from operators' offhand estimates of salvage value. Accordingly, a detailed study was made of the replacement of parts and the condition of such parts of a discarded engine as might be capable of rendering further service. This was developed on the basis of 800 to 1000 hours of use and assumed regrinding of all cylinders after the first 500 hours or so. A parallel estimate was also made on the basis of 500 hours of use without provision for regrinding of cylinders. Using some approximate prices for the parts, tables were compiled for the two conditions. From these it appeared that the figure of \$1000, which one operator suggested for the salvage value of the same engine errs rather much on the conservative side.

Against this must be balanced the question of obsolescence previously mentioned. If it became desirable to change from an early type of engine to a more recent one, the salvaged parts on hand would become almost valueless. Considering these elements a thoroughly conservative allowance might be regarded as 30 per cent of the initial cost of the engine on the basis of 500 hours of use (without regrinding), or 20 to 25 per cent of this cost for 800 to 1000 hours of use assuming regrinding of all cylinders. These figures are slightly more than the writer previously recommended for water-cooled engines but they are justified by the liberal allowances made for parts replacement during overhauls and by the particular characteristics of the type of engine considered.

Depreciation Charge

The foregoing discussion brings us to the point where we may consider the engine depreciation charge. This item, incidentally, is an important one in present day operating costs. From the figures given as recommended practice in estimating salvage, it will be noted that the net depreciation will be about 70 per cent on the 500 hour basis or about 75 per cent on the 800 to 1000 hour basis. Thus, taking a typical case where the initial cost is \$5500 for a 200 hp. engine, the depreciation cost per flying hour will be \$7.77 on the 500-hour basis, \$5.20 on the 800-hour basis or \$4.16 on the 1000-hour basis. The economy of regrinding parts is, of course, evident just as it would be with any other type of engine, whether airplane or automobile. The writer personally has constantly advocated regrinding

of aircraft engine cylinders and (where possible) crankshaft as standard practice for all civil operations. In many cases it is practicable to regrind cylinders twice and in others it becomes both practicable and advisable to regrind certain other parts, such as the crankshaft, also.

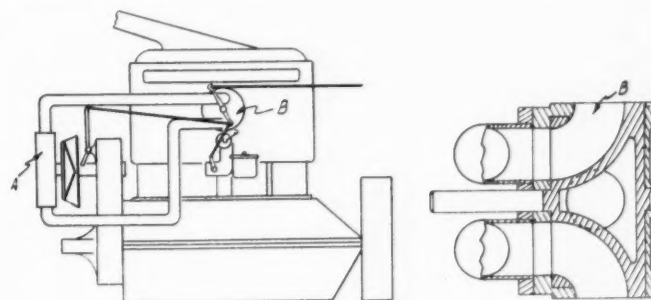
Many of our present-day operating and maintenance practices have been inherited from the Army and Navy where the major considerations are totally different from those of commercial activities. The high grade of material and workmanship entering into aircraft engines forces up the cost of the engine and of replacement parts. The initial high cost makes depreciation charges a very serious item. The most direct way of cutting these charges is by extending the life of the engine by the adoption of the practice of regrinding or replacing every part to which this policy can be possibly applied. The truth of this should be obvious, yet it does not appear to be very generally recognized today.

In all military operations standardization, interchangeability and the reduction in types of replacement parts rank above cost in importance. In commercial operations cost is almost the only consideration on the operating side. Too much military and too little commercial training is one of the great disadvantages under which the operator of aircraft labors today. Any practice which helps to reduce costs must be carefully considered and we must adapt ourselves readily to the changed conditions of civil operations if air transport is to become a business proposition.

Supercharger Operating Valve

IT would seem that the only practical way of using a supercharger on stock cars is to so arrange it that it can be put in action and cut out whenever the driver desires, without stopping the car. One method at present in practical use consists in opening and closing a friction clutch through which the supercharger or pump is driven from the engine crankshaft, and another method has been patented recently in England by L. Coatalen, of the Sunbeam Motor Car Co.

As shown in the drawing, the supercharger A is located at the forward end of the engine, and both its inlet and outlet connect by pipes to a valve B located at the side of the engine between the carburetor and inlet manifold. In one position of this valve the carburetor is placed in direct communication with the engine, while



Coatalen's valve for supercharger engines

in the other position this communication is interrupted and the inlet to the supercharger is opened through the valve to the carburetor and the outlet from the supercharger is opened to the engine. The valve is arranged for operation from the driver's seat.

Taxi Company Saves 80% of Crankcase Oil by Recovery System

Philadelphia Yellow Cab Co. uses motor-driven centrifugal purifier and supplementary apparatus to eliminate diluent and solid impurities. Reclaimed oil like new in viscosity.

By T. O. Day

Master Mechanic, Philadelphia Yellow Cab Co.

LATE in 1923 we started an investigation to determine whether crankcase drainings could be reclaimed for re-use in engines. By rigging up a 50-gal. oil drum with a perforated steam pipe, from which steam was allowed to pass up through the oil, it was shown that fuel in the oil could be driven off, but it was also found that the dirt in the oil, composed of road dust, metal particles and carbon, would not readily settle out.

After this, we secured a De Laval centrifugal oil purifier which was used in conjunction with the apparatus described above. In using the centrifuge, the crankcase drainings were treated as before, and while hot were passed through the oil purifier, which removed the heavy carbon, water and any abrasive material which might be present, but it was found that considerable colloidal carbon remained in suspension and could not be thrown out of the oil by centrifugal force.

Gold Dust is Tried

Further experiments were conducted by dissolving Gold Dust in a sufficient amount of water to make a saturated solution and adding this to the crankcase drainings just before the steaming operation was finished. After the mixture was thoroughly agitated, it was passed through the oil purifier and the reclaimed oil came out in much better condition. The function of the Gold Dust was to coagulate the carbon and any other suspended impurities in the oil.

With this arrangement it was possible to reclaim oil which after being finished was of only a fair quality, this being largely due to our inability to apply heat in the proper manner. However, the management considered our results sufficiently satisfactory to warrant further investigations.

Following this, we secured a 100-gal. Richardson-Phenix oil filter. In this equipment the oil is subjected to steam agitation and distillation and to gravity filtration.

The manufacturers of this equipment recommend the use of steam at 30 lb. pressure for distilling off the diluent, but we could not supply steam at more than 15 lb. pressure and this made it necessary to steam a batch of oil for a much longer period of time.

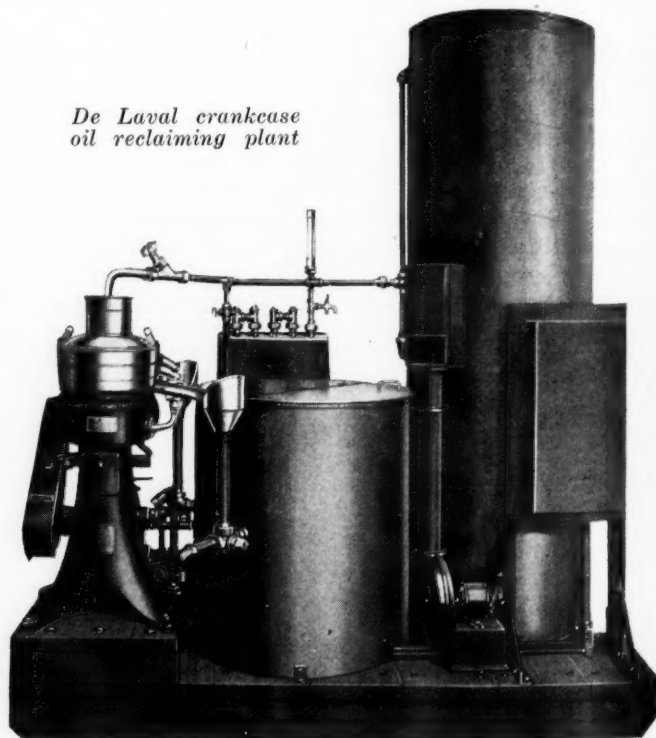
In this case the crankcase drainings were steamed for a period of from five to eight hours, depending on the amount of dilution, after which the steam was shut off and the Gold Dust solution added; the steam was then again turned on for a period of about one-half hour, this

being necessary in order to agitate and thoroughly mix the Gold Dust solution with the batch of crankcase drainings. The batch was then allowed to settle for a period of 20 to 24 hours. After settling, the batch in the filter was divided into three distinct layers. At the bottom there was a layer of water; next came a layer of sludge and on top was clean oil. The clean oil was removed by decanting it off from the top, the level being kept up by slowly admitting water at the bottom of the purifier.

Steam Pressure Too Low

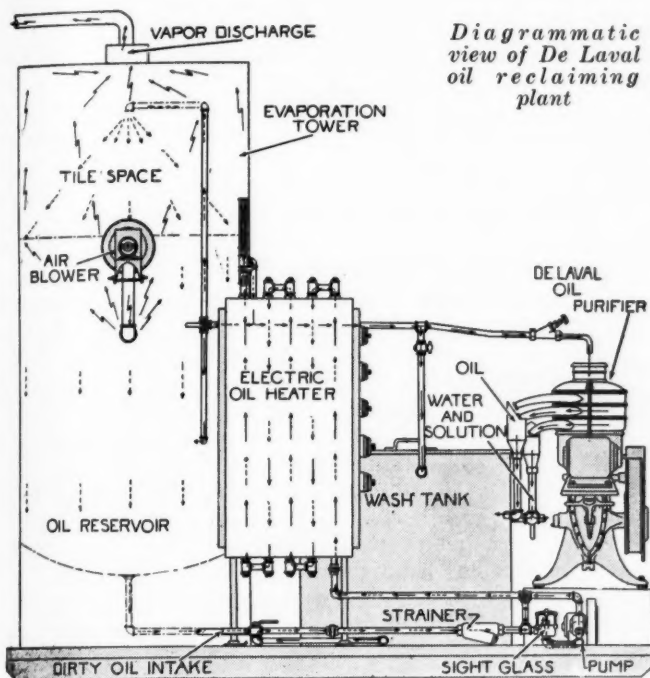
This apparatus was used on an experimental basis for some time, and on Oct. 1, 1924, we commenced reclaiming all our crankcase drainings and were able to effect a considerable saving by so doing. Some difficulty was experienced, however, as a slight amount of dilution remained in the reclaimed oil, this being partly due, no doubt, to our low steam pressure. Also, occasionally a batch was lost due to emulsification which it was impossible to break down and separate with the gravity

De Laval crankcase oil reclaiming plant



type of filter. This, of course, involved a considerable loss of oil but, notwithstanding this, for a period of several months' operation, our yield of reclaimed oil amounted to 57.5 per cent.

Next we were informed that the engineers of the De Laval Separator Company were working on an apparatus comprising all the elements necessary for restoring the



Diagrammatic view of De Laval oil reclaiming plant

original characteristics of used oils, and we had one installed in one of our garages. This equipment includes a motor-driven De Laval oil purifier for centrifuging out of the oil such solid impurities and water as it may contain; a wash tank for chemical treatment and washing of the oil in order to coagulate and make possible the removal of suspended colloidal carbon; a motor-driven oil pump, an electric heater for keeping the oil at the proper temperature during the process of purification; a motor-driven blower; an evaporation tower filled with tiling through which the oil and heated air are passed in counter currents for evaporating off the fuel dilution in the oil; strainers; sight-flow glass; piping, etc.

After completing the installation of the outfit, a number of experiments were conducted which showed an average yield of 80 per cent or better, or approximately 23 per cent more than that obtained from the equipment previously used.

Tests of the oil reclaimed with this equipment showed it to be just as good as new oil—a degree of perfection which previously we had been unable to attain. In cases where the refining process was continued to the point of entirely freeing the oil from the fuel dilution, the viscosity was sometimes slightly higher than that of the original oil. We believe there are two possible reasons for this:

First: That the application of heat to the oil not only distills off the gasoline dilution but also in all probability distills off some of the lighter ends which remained in the oil after the original refining.

Second: We believe that the oil becomes slightly oxidized by the action of blowing heated air through it as it flows down through the retort filled with tiling.

However, we are informed by reliable laboratories that this does not in any way impair the value of the reclaimed oil for our regular use and that the reclaimed oil is just as good as, if not slightly better than, the fresh or new oil.

With further reference to the quality of the reclaimed oil, a great many samples of our reclaimed oil were carefully analyzed in the laboratory of an oil company and the results were such that they recommended a common storage tank for both new and reclaimed oils.

From the description of this equipment, it may seem that its operation would involve considerable complications. However, this is not the case, as we have obtained satisfactory results with ordinary garage or shop help under good supervision. The unit is quite complete in itself and is as nearly fool-proof as possible.

Subsequent to our experimental work with the De Laval oil purifier, the unit was purchased and has been in almost regular daily operation for the past eight months. Our practice is to drain our crankcases at regular intervals, taking from them approximately 1300 gal. per month, of which, as previously noted, we recover 80 per cent or 1040 gal.

Our records show that, neglecting depreciation and overhead, it costs 10.5 cents per gallon to reclaim this oil. This shows a considerable saving when compared with the cost of new oil.

The advantages we have thus far derived from the use of the crankcase oil reclaiming outfit have been confined solely to reducing our lubricating costs. We believe, however, that we can retain a large part of this saving and add further savings.

Tentative plans have been made to double the capacity of our reclaiming outfit by adding standard De Laval units to the present equipment. This would enable us to drain our crankcases at more frequent intervals, and this, we believe, will result in a considerable increase in mileage between complete overhauls.

Multiplehead Air Brush

THE Paasche Air Brush Co., Chicago, has developed a new air brush called the UB Multiplehead which is said to be the first completely interchangeable, quick detachable, combination round, revolving, floating and adjustable fan spray brush head ever made with a range of five air brushes in one.

It is suitable for finishing or coating with materials from the lightest to the heaviest, coarse or fine, hot or cold, with a crescent shaped fan producing air ports which harmonize and balance with a round air cone in the air cap, thus making split or uneven spray impossible.

From a strong jet of clean air used for dusting off the work before painting, adjustments can be made to give a fine line of paint or a smooth fan spray from 12 to 16 in. wide. All adjustments are controlled by the operator by a touch on the trigger so that it is claimed that the smallest or largest surface or combination of small or large surfaces can be finished with a minimum of time.

TO judge by an item in the French Official Bulletin of Commerce and Industry, the French general public is not as keen on aviation as might be expected. Of the air passengers which embarked at the chief French air port, Le Bourget, during the month of November, only 7 per cent were French, while 49 per cent were English, 23.5 per cent American, 8.5 per cent Dutch and 13.3 per cent of various nationalities.

Dewandre Vacuum Servo Brake Being Demonstrated in U. S.

Reduces effort required to apply brakes by about 75 per cent and permits of varying retarding force within wide limits.
Used in Belgium, France and England.

By P. M. Heldt

GREAT power and smoothness of operation, positive control and the ability of the driver to gage the braking effort by the pressure which he exerts on the pedal are some of the advantages claimed for the Dewandre vacuum servo brake which originated in Belgium some years ago and which, after having been placed in production in Belgium, France and England, is at present being demonstrated to American makers by Paul Kelecom, an engineer connected with the company owning the patents.

Inasmuch as the Dewandre device actuates the brake by power derived from the engine, it is properly classed as a power brake. A difficulty with many brakes of this

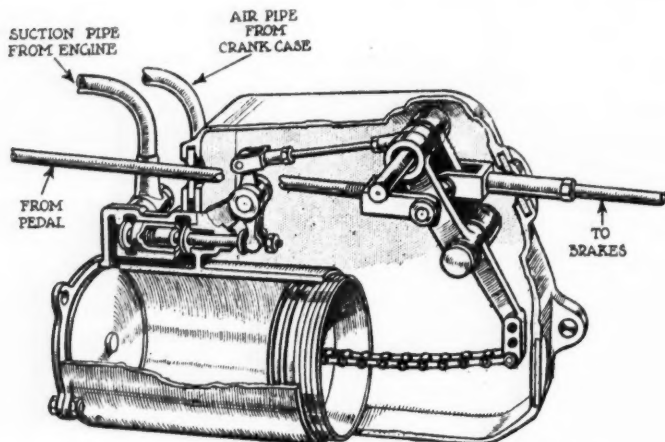
pressure available effective on the piston or diaphragm, any further motion of the pedal produces no increase in braking effect. It is hardly necessary to point out that the realization of the driver that by merely pressing harder on the pedal he can increase his braking effect almost indefinitely is of considerable psychological value.

The Dewandre vacuum brake comprises a cylinder which, in the case of the installation on the 30 hp. Minerva which Mr. Kelecom uses for demonstrating purposes, is of 125 mm. or about 5 in. bore. In this cylinder there is a piston of trunk form but proportionately shorter than an engine piston, which has a number of grooves formed on its circumference which are filled with suitable packing material. The cylinder is closed at one end and open at the other, and a chain connects the piston with the brake linkage.

Valve Chamber on Cylinder

On top of the cylinder is located a valve chamber in which are located two flat-seated poppet valves. From this valve chamber one hose pipe extends to the inlet manifold and another to the engine crankcase, so through the action of the valves the cylinder can be placed in communication with either the inlet manifold or the crankcase, in which the latter pressure is atmospheric.

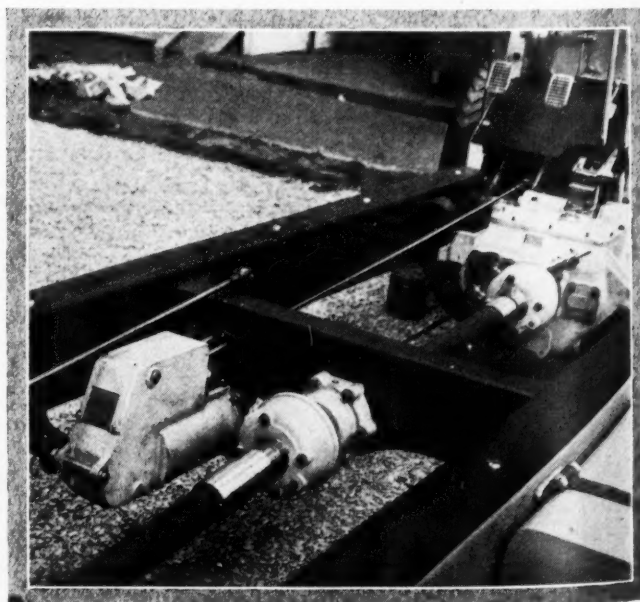
Referring to the diagram of the installation, from the regular brake pedal a rod A extends to a double-armed lever BC which has a floating fulcrum at X on the single-armed lever D, the latter in turn being fulcrumed in the



Sketch showing cut-away view of the brake cylinder and attached mechanism

type in the past has been that they have afforded no control of the braking power. Such braking deserves generally comprise either a cylinder or a diaphragm chamber, and a valve by means of which the gaseous pressure operating the brakes can be made to act on the piston or diaphragm or be cut off therefrom. Hence the operator could apply the brakes only with a certain definite force and could not graduate it finely, as is often desirable under the varying conditions of driving.

Another defect of some of these brakes has been that the driver has no indication of the braking effort exerted other than the effect produced on the car. If he wants to brake the car more energetically, the natural impulse is to press harder on the pedal, and with the ordinary system of direct braking, the farther he pushes the pedal the more resistance he encounters. Pedal travel, resistance to pedal motion and braking effect are therefore directly related. On the other hand, if the motion of the pedal merely opens a valve which makes the whole of the gaseous



Dewandre vacuum brake mounted on truck chassis

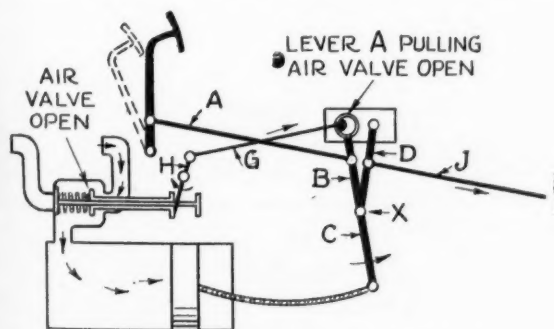
upper part of the housing of the vacuum device. Lever *BC* is formed with an eye at its upper end which surrounds the pivot bolt *F* on which lever *D* is carried, and this eye is of somewhat larger diameter than the bolt itself, which gives lever *BC* a certain freedom of motion around floating fulcrum *X*.

From the eye of lever *BC* a rod *G* connects through a double-armed lever *H* to the two poppet valves previously referred to. Now suppose that the driver presses lightly on the pedal. The effect of this will be to rock lever *BC* left-handedly around floating fulcrum *X*. Rod *G* will then be moved toward the left, the direction of motion is changed by the double-armed lever *H*, and the vacuum valve (the one on the left) will be moved from its seat.

Suction of Engine Cylinders

This places the brake cylinder in communication with the inlet manifold, and the suction of the engine cylinders immediately removes some of the air from the brake cylinder. The result of this is that the piston in this cylinder is forced inward by the atmospheric pressure against its outer side. A very interesting leverage action now takes place. To explain this it is probably best to first describe the action which takes place when the vacuum cylinder is not working for any reason, as if the pipe to the inlet manifold were disconnected. The pull exerted on the rod *A* by the pressure of the driver's foot would then be transmitted from lever *BC* to lever *D* by way of the floating pivot *X*, and thence to the brake rod *J*. Since rod *J* is in line with rod *A*, the motion of both rods will be the same and there will, therefore, be no change in the pull; in other words, the pull on rod *A* produced by pressing on the pedal will in that case be transmitted without modification to the brake rod *J*.

On the other hand, when the piston in the vacuum cylinder pulls on its chain the lever *BC* acts as a balance lever. For the sake of simplicity we will assume that the distance of the point where rod *A* attaches to lever *BC*, to the fulcrum point *X*, is the same as the distance from the point where the chain attaches to the lever to the fulcrum point *X*. Then, to balance the pull of the



Brake shown in released position, air valve being held open

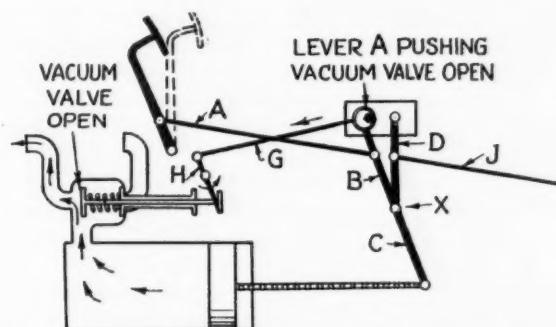
piston the driver would have to exert an equal pull on rod *A*. The force on the fulcrum point *X* would be the sum of the pulls on rod *A* and on the chain, and the force exerted on the brake rod *J* would be substantially twice this sum, because brake rod *J* is attached to lever *D* at about the middle of its length. Hence, for a given pull *P* on the pedal rod *A*, a pull $4P$ is exerted on brake rod *J*.

When the driver first presses on the pedal, lever *BC* will rock left-handedly around its floating fulcrum *X*, whereby the valve rod *G* is moved to the left and the vacuum valve opened. However, as soon as the piston begins to pull on the lower end of lever *BC*, the latter tends to return to its original position by rocking right-handedly

on its floating pivot *X*. The exact action which then takes place depends upon how hard the driver presses on the pedal. If he presses only moderately hard, lever *BC* may return to a central position, where the eye at its upper end is symmetrical with respect to the pivot bolt. In that case the vacuum valve closes and the pull of the piston thereafter remains constant. On the other hand, if he lessens the pressure on the pedal, the lever *BC* will be rocked to its extreme position to the right, which results in the opening of the atmospheric valve, as shown in one of the diagrammatic illustrations. Air then rushes into the brake cylinder, the pull of the piston on the chain ceases, and the brakes are released.

Thus the driver has it within his power, by pressing more or less on the pedal, to change the degree of vacuum in the brake cylinder, and, consequently, the pull applied to the brake rod *J*.

On the Minerva car which Mr. Kelecom is using for demonstrating purposes two pressure gages are mounted side by side, one connected to the inlet manifold, the other to the brake cylinder. These gages are graduated in meters of water column. Average atmospheric pressure is equal to 10 1/3 meters of water, and the maximum vacuum in the inlet manifold, which occurs when the car



Schematic diagram of brake cylinder and linkage showing vacuum valve held open

is coasting down hill with the clutch engaged, is about 8 meters. One of the two gages will show the vacuum existing in the manifold, which may be anything up to 8 meters, depending upon the engine operating conditions, while the other gage shows the vacuum in the brake cylinder, which is generally less than that in the manifold but approaches it in value when the driver presses hard on the pedal.

The object of connecting the atmospheric valve of the brake cylinder to the engine crankcase is to allow an oil mist to be drawn into the brake cylinder when the vacuum is broken, which dispenses with the necessity for oiling the brake cylinder.

The fact that the vacuum reduces the pressure required on the brake pedal by about 75 per cent makes obvious the advantage of such a brake, especially in the case of heavy, high speed vehicles and in city driving, where stops must be made frequently. A demonstration given the writer showed that the brake is not only powerful, but also smooth in action.

Among the European manufacturers which are fitting this brake are Isotta Fraschini in Italy, Ballot, Delage and Voisin in France, Minerva, Nagant, Miesse and Dasse in Belgium, Horch in Germany, and Morris, Sunbeam and Talbot in England.

THE International Nickel Co., 67 Wall Street, New York, N. Y., has begun the publication of a series of bulletins on nickel steel. The first two contain the S. A. E. steel specifications and material taken from a bulletin of the Bureau of Standards on Nickel and Its Alloys.

How American Car Design Differs from British

Comparison of models here with those in England shows number of interesting variations in current practice.

By K. W. Stillman

IN a number of respects British car designers have views which are quite different from those held by designing engineers of this country. This fact is brought out by the accompanying table which compares a number of points of car design which are to be found on the 1926 models of British and American passenger cars. To some extent these variations, particularly those in engine displacement and transmission, are caused by the high cost of fuel in Great Britain and the high taxation rates which are based on horsepower rating of the engine.

British designers still stick to the four-cylinder engine with total piston displacement of between one and one-and-a-half liters, this type being used on nearly three-quarters of their models. The percentage of six-cylinder models in great Britain is just one-third that of the American figure.

The widest divergence is found in displacement figures. Over half (62 per cent) of British engines have less than two liter displacement while there is not a single American model in this class. In the two to three liter class the two countries are in rather close agreement but 85 per cent

of American models have more than three liter displacement while but 19 per cent of British engines are of this size.

British designers show a preference for valve-in-head motors while Americans remain content with L-head engines. Sleeve valves are about equally popular.

While practically all American models have three speed transmission, in Great Britain four speed transmissions make up well over half the total. This is undoubtedly influenced by the preponderance of low power cars sold.

While pump circulation of coolant has won the American field, British engineers are about equally divided between that type and the thermo-syphon system.

Spiral bevel rear drive wins in both places but an interesting sidelight is the relative popularity of worm drives in Great Britain while America has only one model so equipped.

Semi-elliptic spring suspension, front and rear, are in favor, with cantilever and quarter elliptics receiving considerable more attention in Britain than here.

Balloon tires and four-wheel brakes have been adopted by a majority of designers in both countries with British engineers going in more strongly for four-wheel brakes than have designers on this side of the Atlantic.

It might be interesting to compare the elements of design for the cars most popular to American and to British designers, as evidenced by percentage figures given in the table. In doing this it must be remembered that this entire discussion relates to models and not to cars produced so that although it may show which designs are most popular with engineers it does not necessarily mean that these designs are equally popular with the public. To determine this the percentage of models would have to be modified by their production to evaluate the extent of the public's approval for the car.

Following is a side-by-side comparison of what constitutes the most popular car to the designers of the two countries:

The majority of American car models have six-cylinder engine with total displacement of about 200 cu. in., with L-head motor; three speed transmission and single plate clutch. Cooling water is circulated by pump. Rear drive is spiral bevel gear; front and rear springs are semi-elliptic; wood spoke artillery type wheels are equipped with balloon tires and four-wheel brakes are fitted.

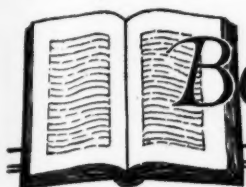
Comparison of Various Design Features Between British and American Cars

	American (101 Models)	British (115 Models)
Number of Cylinders		
4 Cylinders	13	73
6 Cylinders	66	22
8 Cylinders	21	5
	100%	100%
Piston Displacement		
Under 61 cu. in. (1 liter)	0	4
61-90 cu. in. (1-1½ l.)	0	37
90-122 cu. in. (1½-2 l.)	0	21
122-183 cu. in. (2-3 l.)	15	19
183-244 cu. in. (3-4 l.)	34	19
244-305 cu. in. (4-5 l.)	30	
Over 305 cu. in. (5 liters)	21	
	100%	100%
Valve Location		
L-head	74	39
Valve in head	17	54
Sleeve valves	5	7

	American (101 Models)	British (115 Models)
Others	4	
	100%	100%
Transmission		
Three speed	95	38
Four speed	4	59
Others	1	3
	100%	100%
Clutch Type		
Single plate	67	61
Multiple disk	32	14
Cone	1	25
	100%	100%
Water Circulation		
Pump	89	48
Thermo-syphon	10	51
Other	1	1
	100%	100%
Rear Drive		
Spiral bevel	97	81
Worm	1	16
Others	2	3
	100%	100%
Spring Suspension Rear		
Semi-elliptics	82	56
Cantilever	9	21
Quarter elliptic	1	20
Others	8	3
	100%	100%

The majority of British car models have four-cylinder engines with total displacement of about 75 cu. in., with valve-in-head motor; four speed transmission and single plate clutch. Cooling water is circulated by thermo-syphon system. Rear drive is spiral bevel gear; front and rear springs are semi-elliptic; steel spoke artillery type wheels are equipped with balloon tires and four-wheel brakes are fitted.

	American (101 Models)	British (115 Models)
Spring Suspension Front		
Quarter elliptic	0	11
Others	3	3
	100%	100%
Type of Wheels		
Wood spoke artillery	74	0
Steel spoke artillery	6	50
Disk	22	23
Wire	4	27
	100%	100%
Tires		
Balloons	89	65
High pressure	11	35
	100%	100%
Brake Equipment		
Four-wheel	63	77
Others	37	23
	100%	100%
Semi-elliptic	97	86



Books for the Business Bookshelf

Kiln Drying of Lumber

SEVERAL factors have, during recent years, directed considerable attention to the drying of lumber in kilns. There being little information generally available on the subject, the University of Wisconsin had its University Extension Division prepare a correspondence study course covering the general principles of dry kiln operation. This text was prepared by Arthur Koehler and Rolf Thelen and the present book, "The Kiln Drying of Lumber" (McGraw-Hill Book Company, New York), represents the latest revised and enlarged text material developed from the interrelation between the authors in their laboratories and men in wood-working industries.

Since a knowledge of wood and its behavior under various conditions of moisture is necessary for the operations of dry kilns, the first few chapters are devoted to this subject. Then follow chapters on types of dry kilns, the action of heat and how it may be applied, humidity and evaporation, circulation and piling of lumber in the kiln, and the selection layout, construction and operation of dry kilns.

Are You an Organer?

IF, as is quite likely, you know nothing about the philosophy and science of Organing, and if you would become familiar with it and make of yourself a practicing Organer, you must read the "Manual of Organon, the Philosophy and Science of Organing, the Art of Management," a 32-page booklet compiled, edited, published and distributed by Chas. W. Gremple, the inventor of Organon. Organon is apparently based on the law promulgated by Mr. Gremple that like conditions plus like causes necessitate like effects. In order to make this clear some extracts from the book are given: "Likeness-unlikeness is the phenomenon of phenomena," "Synonymous with necessity is the Absolute which, while apprehendable by faith, cannot be cognized," "the necessitation of the cosmos is persistent," etc.

Mr. Gremple undertakes to prove that Dr. Frederick Taylor, Harrington Emerson, Gantt, Going and other pioneers in management are unphilosophical, unscientific and untechnical. The book presents an excellent manual for cross-word puzzle fans seeking new words. It can be read in about 10 minutes and, with luck, the reader may discover what it is all about, if anything, in as many years.

German Motor Truck Design

WE have received a copy of a book in German, by Dipl.-Ing. Paul Friedmann, dealing with the subject of the Motor Truck. It bears the sub-title "The Bases of Economic Operation and Rational Design" and is said to be intended as a practical guide with respect to the conditions under which motor transport is superior to all other forms.

In pursuance of this object the author in the first chapter deals with cost calculation, which topic naturally interests the prospective owner, but it would very much appear that this chapter was an after-thought, for the bulk of the book is devoted to a discussion of the mechanical features of motor trucks and to illustrated descriptions of same. The

chapters dealing with mechanical subjects begin with the engine and end with wheels and tires, and they are followed by chapters giving brief, illustrated descriptions of trailers and standard and special forms of commercial vehicle.

To the American engineer the book probably would be of interest chiefly because of its numerous sectional and other illustrations of German motor trucks, some of which, unfortunately, are on a rather small scale and indistinct. The publishers are Klasing & Co., G. m. b. H., Berlin W-9, Germany.

Trade Commission Arraigned

IN a scathing criticism of the Federal Trade Commission, H. A. Toulmin, Jr., in a booklet entitled "Bothering Business," claims that the Commission has the following faults in its present plan of operation: 1. Giving publicity to complaints before sufficient evidence to justify them has been secured. 2. Persistence in pursuing activities that have been held to be illegal and in prosecuting concerns for doing things that courts have held to be legal. 3. Unnecessarily complicated procedure which delays and increases expense of work. 4. Carrying on work which should be done by some already existing Government department. 5. Handling cases that should be presented to the courts.

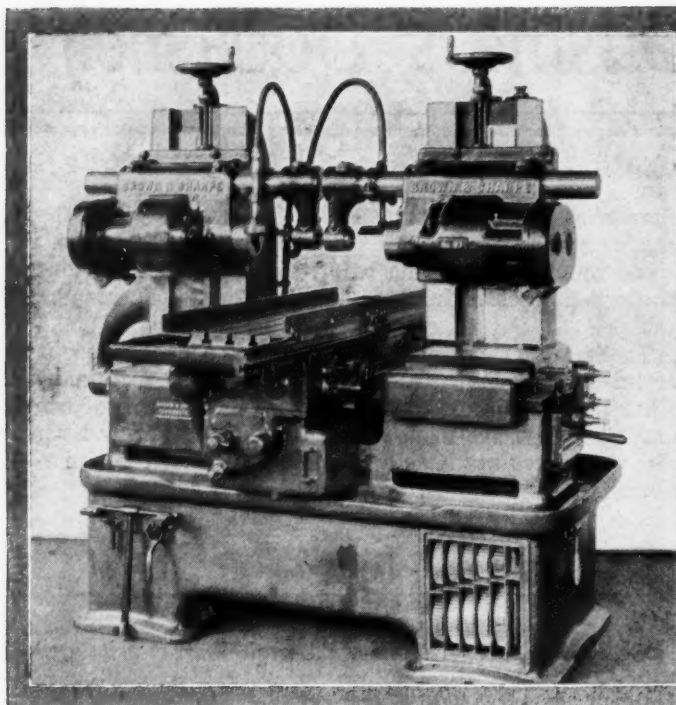
He offers suggestions for changes which, in his opinion, would make the work of the Commission more beneficial to legitimate business, as it was intended to be when instituted by Congress. The book is published by B. C. Forbes Publishing Co.

"See America First"

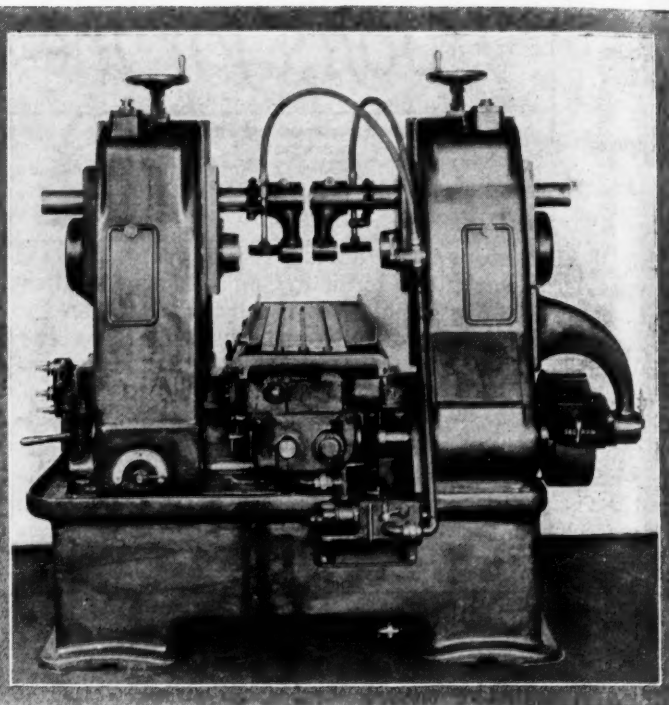
THE advent of the automobile has done much to acquaint us with the beauties of our own country and to everyone who reads "Picturesque America—Its Parks and Playgrounds" will come a longing to include themselves in the constantly growing band who have seen America first. This book is edited by John Francis Kane and published by Resorts and Playgrounds of America. Maps showing automobile roads and trails in the numerous National parks are included; the illustrations are profuse and charming; the text is expressive and appealing. The general impression left with the reader—even one who is strongly averse to "waving the flag"—is that the old slogan "See America First" is well worth following out.

An Advisor for Inventors

IN "The Inventor's Advisor," a booklet prepared and published by William C. Linton, a great deal of information is presented concerning patents, designs, copyrights, trademarks, labels, etc. After a brief history of patent laws, information is given as to what may be patented, who may take out patents and how it may be best accomplished. Similar information is presented on the other forms of property, the possession and use of which are regulated by law. The booklet should be of real value to anyone interested in obtaining governmental protection for their ideas or inventions.



*Brown & Sharpe Automatic Duplex milling machine,
front view*



*Brown & Sharpe Automatic Duplex milling machine,
rear view*

Full Automatic Table Control a Feature of New Milling Machine

Production miller brought out by Brown & Sharpe is of two spindle type. Adapted for full automatic, part automatic, and intermittent table operation. Uses variety of fixtures.

BROWN & SHARPE MFG. CO., Providence, R. I., has recently added to its line of automatic milling machines the No. 37 Automatic Duplex, a two-spindle machine of the manufacturing type. Its two uprights and opposed spindles permit the use of two face mills or of two gangs of cutters working simultaneously. This machine is specially adapted to face-milling operations, while by using cutters on arbors, a piece can be milled both above and below at the same time.

The inside spindle rotates in one direction only, at a speed determined by the change gears used. The outside spindle runs either forward or reverse, at a speed also controlled by change gears. It can be easily reversed by throwing a lever at the base of the head. On work requiring the use of only one spindle, the outside spindle can be set to remain stationary.

A feature of the machine is the full automatic table control. Both the fast travel and cutting feed of the table operate automatically in either direction, making the machine adaptable to the Brown & Sharpe method of milling, with a fixture at each end of the table. This feature is also of advantage when part automatic operation is desirable, or necessary, for special working conditions. Accurate setting of the table is quickly and easily made, and the tripping levers are located for convenience

in starting, this being of particular advantage when the operation is part automatic.

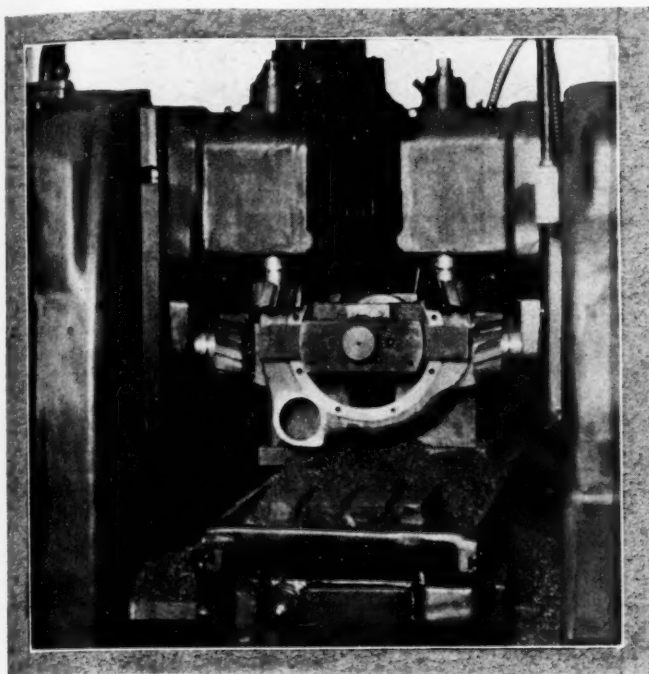
The machine is of the constant speed drive type, having independent spindle and table drives and independent speed changes for each drive. It can be readily equipped with individual motor drive. Each of the two spindles is provided with independent vertical adjustment and with a separate set of change gears. The upright mounting the main spindle is cast as a part of the bed, while the outside upright is adjustable and is provided with a transverse movement of 7 5/8 in.

Constant Fast Travel

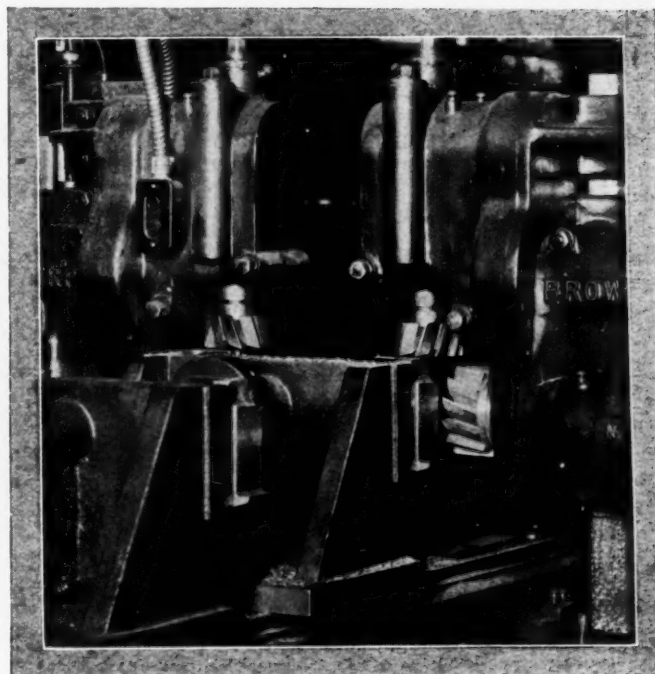
A salient feature of the machine is the automatic movements of the table in either direction, which includes a constant fast travel, a variable cutting feed, reverse, and stop. Any or all of these movements may be used during a cycle of operations, and may be controlled automatically by adjustable dogs on the front of the table.

The start, stop and reverse movements of the table are also controlled by a hand lever at each end of the saddle. Another hand lever on the left of the saddle controls the cutting feed and constant fast travel.

The automatic operation of the table with feed in either



Face milling joint surface and supporting arm pads on flywheel housing



Same operation viewed from other end of machine

direction makes possible the use of the Brown & Sharpe method of milling, with a fixture on each end of the table. With this set-up, when the machine is started, the work in one fixture is brought up to a point just before engaging the cutters, at a constant fast travel of 210 in. p.m., and the cutting feed is automatically engaged. At the completion of the cut the table is automatically reversed, the constant fast travel engaged, and the work in the other fixture is brought up to the cutters, where the foregoing cycle of operations is repeated. By this method the operator may load one fixture while work is being milled in the other.

Other Operations Possible

Other types of operation are possible; for example, it may be of advantage to have the table reverse at either end of its travel and stop at the other, or to stop at both ends of its travel. This can be accomplished automatically, it being only necessary to start the table again by throwing the control lever located at either end of the saddle.

Three fundamental cycles of table operation are possible with this machine—full automatic, part automatic and intermittent, and these cycles also may be combined in various ways.

With the full automatic cycle, with a fixture at each end of the table, the work in one is milled while that in the other is being replaced. The cycle is repeated automatically as follows: Table advances at fast travel to cutting position; cuts, reverses, advances at fast travel to cutting position for fixture at opposite end, and cuts at this fixture while the work in the first fixture is being reloaded. This cycle reduces the non-cutting time to a minimum, as the operator simply reloads the fixtures.

A number of combinations of table movement are possible with the part automatic cycle. If a single fixture is used at one end of the table, which may be necessary when cutting above and below simultaneously, the work is loaded, the fast table travel engaged, the table advances at fast travel, and cuts and returns at fast travel to the loading position, where it stops for reloading.

If a swiveling fixture is used to save loading time, the operator can be loading one station of the fixture while the work in the other is being cut, the cycle being the same as for the single fixture above, except that the table stops to permit indexing of fixtures in place of complete reloading.

Use can be made of the intermittent cycle when two or more fixtures can be set up in line, having varying amounts of cutting feed and fast travel jumps between. The table reverses at the end of the last cut and returns to the loading position at fast travel, where it stops. The pieces are removed as they come out from under the cutters, except the last piece, which is returned to the loading position. The first fixture is then loaded before the operator trips the fast travel control to repeat the cycle, the other fixtures being loaded as the cutting progresses.

In the above cycles, instead of returning the work past the cutters at fast travel, if desirable it can be returned at cutting feed until clear of the cutters, before the fast return travel is automatically engaged.

Also, in other than the full automatic cycle, the table can be set to stop for unloading before returning, so that no finished work is passed back over the cutters.

The general design of the machine permits the use of various special attachments. Multiple or angular heads or simple horizontal and vertical heads, similar to the one illustrated, greatly increase the range of work which the machine can handle.

The accompanying set-up illustrates a typical job on these machines in which special fixtures and attachments are used. This job called for the milling of the support seats of flywheel housings—six surfaces in four planes. The standard Brown & Sharpe No. 37 Automatic Duplex is fitted with two vertical spindle milling attachments—one on each machine head. The work is located in the fixtures by means of pins and is clamped by a single lever. Two fixtures are located at one end of the table as shown in the illustration, the intermittent cycle being used, as follows: In the first fixture, the work is brought up to the cutters at fast travel and the cutting feed is automatically engaged. When the cut is finished, the

work, in the second fixture, is brought up to the cutters at fast table travel and the cutting feed is again engaged. During this cut, the operator unloads the completed work in the first fixture and leaves it empty.

When the cut on the second fixture is completed and the table reverses and returns at fast travel to the original loading position, the operator has only to load the first fixture and engage the fast travel. While the first piece is being milled, the work in the second fixture is replaced.

With this cycle of operations, the machine is cutting almost constantly, the only delay being the time necessary to load the first fixture.

Due to the design of the machine, it is a simple matter to arrange the spindles to rotate in the correct cutting directions. The main spindle and its vertical attachment spindle rotate left handedly, while the outside spindle and its vertical attachment spindle turn right-handedly. As the distance from the surface milled by the vertical spindles to the lip left by the horizontal spindles is held to close limits, fine vertical adjustment is provided to allow for cutter wear.

The M. A. N. Light Diesel Engine

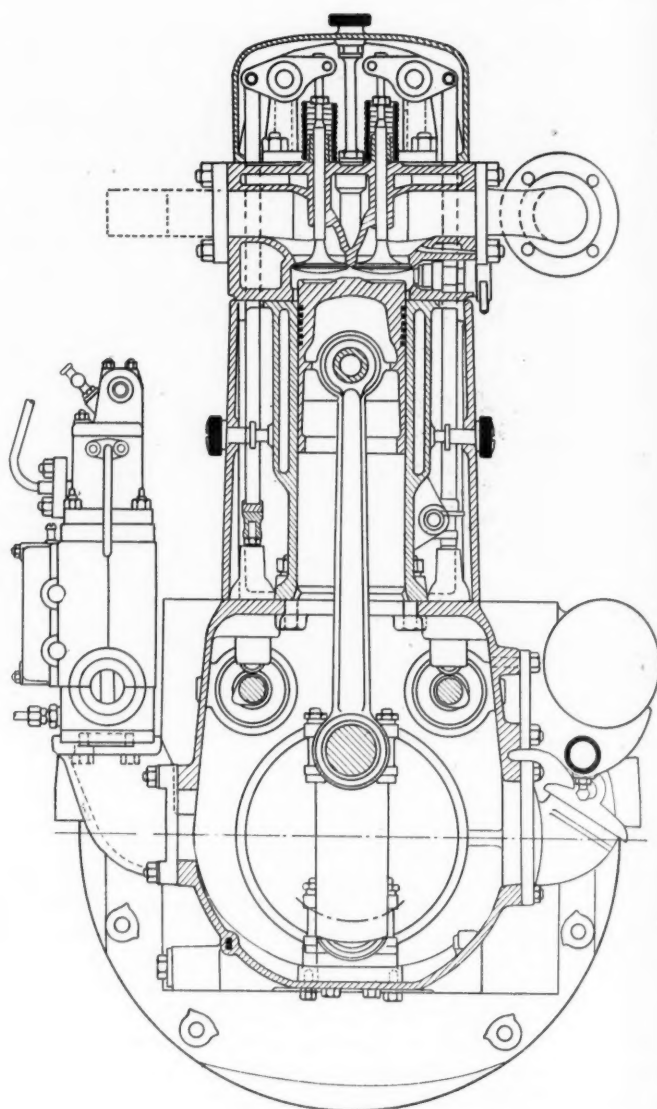
IN a recent issue we described the truck and tractor type Diesel engine developed in Germany by the Benz Motor Co. of Mannheim. Another one of the large German engine works, one of the original manufacturers of Diesel engines, the Maschinenfabrik Augsburg-Nurnberg, commonly referred to as the M. A. N., also has been working on an automotive type Diesel for some time, and we print herewith a brief description and a sectional view of this engine.

In the side of the combustion chamber wall are the fuel nozzles or sprayers. In accordance with the Diesel principle, the fuel is injected and finely sprayed at the end of the compression stroke. A four-plunger pump is used which delivers the liquid fuel to the injectors, each plunger supplying one cylinder.

The injectors are of an extreme simplicity, being composed of only three parts, viz., the body of the injector, the nozzle of the injector which assures a very fine atomization, and a nut by which the fuel pipe is fastened to the injector with an oil-tight joint. The body of the injector is cut with a screw thread so it can be inserted and removed the same as a spark plug. Two injectors are used per cylinder, and they are arranged substantially opposite each other, so the fuel jets cross each other, thereby increasing the turbulence in the combustion chamber. The valves are actuated by means of rocker levers.

The engine is a four-cylinder one having a bore of 115 and a stroke of 180 mm. (about 4½ by 7⅛ in.) A look at the sectional view shows that the designer has aimed to make the engine as symmetrical as possible. There are two camshafts in the crankcase, of which one operates the air inlet and the other the exhaust valves. Both the valve mechanism on top of the cylinders and the rods extending up the sides are hidden by aluminum covers, so that no mechanism shows on the outside.

All of the four cylinders are cast in a single block, while the cylinder heads are in pairs. Oil is circulated under pressure by means of a pump. The fuel pump and starter are located on opposite sides of the engine, having a saddle mounting. Both are very accessible. The engine is



Cross-section of M. A. N. light Diesel engine, a German product

started either by hand or by the electric starter directly from cold.

Tests of power output and specific fuel consumption have been made with this engine, and with an ordinary gas oil the following results were obtained: 32 hp. at 600 r.p.m.; 42 hp. at 800 r.p.m.; 50 hp. at 1,000 r.p.m. and 54 hp. at 1,200 r.p.m. Under full load at from 600 to 1,200 r.p.m. the fuel consumption varies between 205 and 215 grams (0.45-0.48 lb.) per hp. hr. with a minimum very close to 200 grams (0.44 lb.) per hp. hr. at 825 r.p.m.

There is little variation in the mean effective pressure between 600 and 1,200 r.p.m., which decreases from 96 lb. p. sq. in. at 600 r.p.m. to 77 lb. p. sq. in. at 1,200 r.p.m. The lubricating oil consumption is said to be very low; an endurance run of 50 hours under full load showed the oil consumption to be 3 grams per hp. hr. (Less than two quarts for ten hours' running under 50 hp.)

This engine, including a substantial flywheel, weighs 1,100 lb. or about 22 lb. per hp., which is not excessively heavy for a truck and tractor engine. Some of these engines are said to have been in use for upward of 18 months on trucks and farm tractors. So far they have proved very satisfactory, the report states. They are now in regular production.

Fellows Thread Generator is Redesigned

Machine used for cutting steering gear and other worms
is provided with a reversing and quick return mechanism.

THE Thread Generator, which is manufactured by The Fellows Gear Shaper Company, Springfield, Vt., has been redesigned since the original machine was placed on the market. It is now provided with a reversing and quick-return mechanism and several other important features, which not only increase productive capacity but also improve and simplify operation.

Fig. 1 shows a front view of the new model. Here it will be seen that the driving mechanism is located at the right-hand end of the machine, and comprises a gear box and two pulleys. The larger pulley operates the drive for cutting, whereas, the smaller pulley acts as an idler and through the quick-return gear box furnishes the drive to return the cutter-slide to the starting position.

Differential Mechanism Simplified

The differential mechanism, which effects perfect harmony between cutter and work, as the latter is fed longitudinally, has also been simplified, so that for cutting right and left hand threads no changes are necessary in the mechanism itself. To change the machine from right to left hand, all that is necessary is to change the position of the screw in the starting lever and remove or insert a split ring on the cutter-head. Helical gears now drive the work-spindle, and furnish a smoother drive than the spur gears formerly used.

A clutch has been added, so that the power feed can be engaged or disengaged at will. This has been found of considerable convenience when setting up the machine.

This clutch is mounted on the shaft operating the feed gears, which control the rate of travel of the cutter-slide along the bed.

Changes have been made also in the cutter-head control mechanism. On the original machine a control bar mounted at the rear was arranged so as to enable the cutter to take roughing and finishing cuts at the same setting. For most work it has been found that sufficient accuracy and smoothness of finish can be secured in a single cut. This mechanism has now been simplified and three different types of control can be applied. The worm adjustment for setting the cutter to the proper depth is still retained.

The new model Thread Generator can be arranged for either belt or motor drive. A rather simple and effective method of mounting the motor is shown in Fig. 2. A bracket fastened to the rear of the bed carries a trunion upon which an additional bracket is held. The motor is fastened to this second bracket, the pulley on the motor lining up with the two pulleys on the machine. The tension of the belt is taken care of by the adjustable set-screw shown.

THE Statistical Department of the German Government has made arrangements with the Association of German Automobile Manufacturers for compiling statistics of German automobile production. The production of all automobile manufacturing firms in Germany will be incorporated in these statistics.

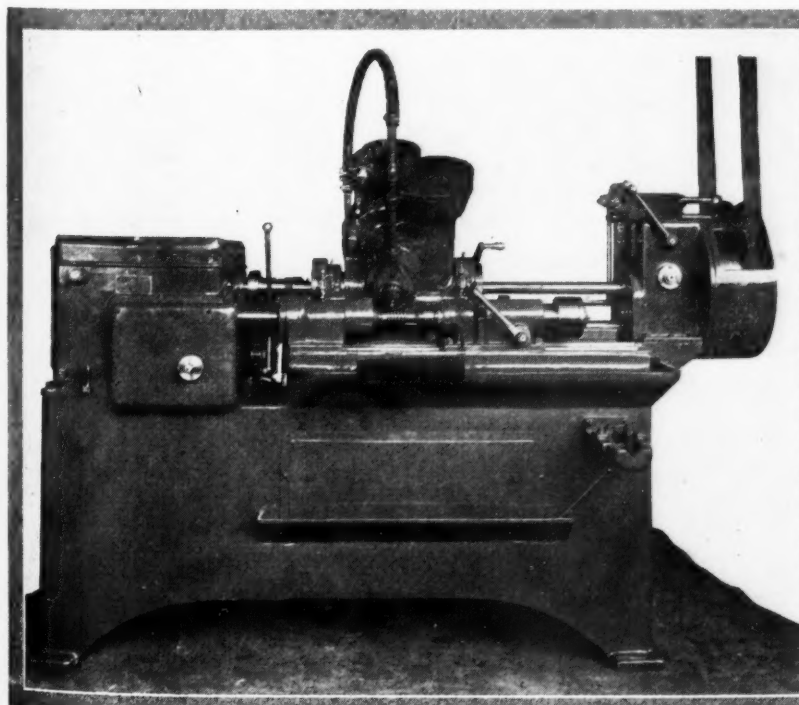


Fig. 1. Front view of new model Thread Generator with quick-return mechanism

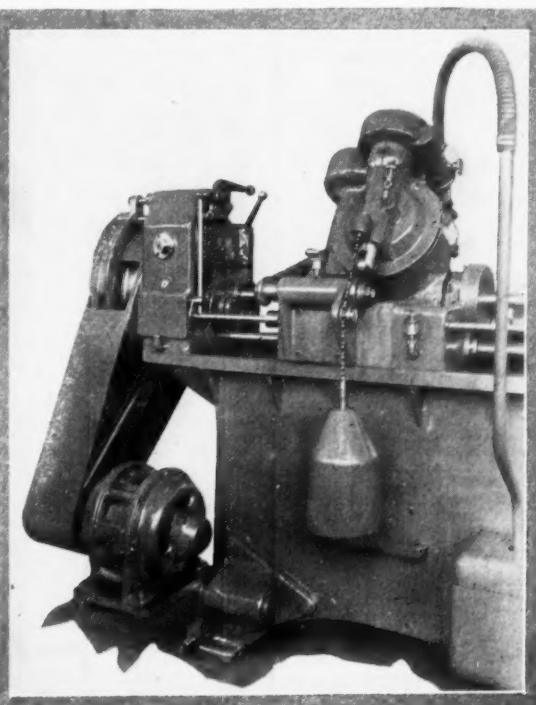


Fig. 2. Close rear view showing simple and convenient arrangement for motor drive

U. S. Exports of Cars, Trucks, Tires and Parts

COUNTRIES	GASOLINE PASSENGER CARS										TRUCKS					
	Up to \$500		\$500 to \$800		\$800 to \$1200		\$1200 to \$2000		Over \$2000		Up to 1 ton		1 to 2½ Tons		Over 2½ Tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Austria	8	\$2,786														
Azores and Madeira Islands	1	275	56	44,486	120	128,299	45	70,549	5	\$12,327	184	\$1,445	1	\$1,709		
Belgium	3	2,626	6	4,731	7	7,581	1	1,329				77,606				
Bulgaria	292	119,410	41	32,432	57	57,430	6	9,517	2	5,305	336	125,297	13	19,541	2	\$4,250
Czechoslovakia			7	4,722	30	32,378	18	31,214	21	2,500	4	6,186	7	7,564		
Denmark	5	2,677	23	18,094	24	24,765	9	14,285								
Estonia	1	50	15	12,828	36	33,065	8	13,176	13	36,225			1	1,457		
Finland									1	2,500						
France	2	1,082	4	2,712	4	4,300	1	1,674	1	2,500			1	1,100		
Germany																
Gibraltar																
Greece																
Hungary	1,549	468,313														
Iceland and Faroe Islands																
Italy																
Latvia																
Lithuania			12	7,626	3	3,420										
Malta, Goso and Cyprus Is.	14	4,596	1	853			1	1,525								
Netherlands			39	37,456	46	46,851	15	24,159	5	17,863	14	6,815	28	36,692	2	4,600
Norway	1	444	16	12,236	11	11,998	3	4,719			2	1,625	9	13,525		
Poland and Danzig																
Portugal			6	4,148	13	14,569	9	14,144	1	2,500	5	4,248	2	1,603		
Rumania			9	6,966	8	8,708	2	3,450	12	33,537	6	2,634				
Russia	1	360														
Spain	28	13,888	95	68,887	166	180,974	62	97,391			114	60,643	8	8,196	6	38,231
Sweden	10	4,770	38	28,339	66	70,393	4	6,726	8	22,479	10	8,978	44	47,957		
Switzerland			20	16,210	18	15,123	11	19,109	4	10,000						
Turkey																
United Kingdom	37	13,400	46	35,135	26	23,164	5	8,584	5	14,392	472	240,566	33	44,793		
Irish Free State			11	8,802	2	1,937										
Yugoslavia			4	3,276	1	1,014			1	2,729					19	49,037
United States	2	988														
British Honduras																
Canada	85	29,787	314	190,952	232	224,494	56	88,392	33	84,788	106	90,252	97	152,555		
Costa Rica	3	1,140	17	7,196	11	11,184	2	3,068			4	3,396	3	2,931	1	1,632
Guatemala	5	2,730	10	7,846	17	18,620	7	11,411	2	5,000	9	5,975	11	15,091		
Honduras	1	370	1	600												
Nicaragua	1	481	3	2,299	16	16,871	2	3,016					1	1,233		
Panama	11	4,345	8	5,616	15	15,636	3	4,542			10	7,126	11	13,748	2	6,976
Salvador	10	3,600	7	5,672	30	32,379	8	12,053	1	2,500	10	5,311	4	5,219	7	18,071
Mexico	500	191,656	194	129,935	149	149,140	28	39,824	34	87,217	157	143,767			11	32,899
Miquelon, Etc.													65	99,091		
Newfoundland	1	410	1	890			1	1,357			1	200				
Barbados	6	2,572	3	2,305	3	3,238	3	4,266							1	1,388
Jamaica	53	20,332	39	25,278	25	26,600	6	8,927	2	4,936	16	6,274	3	4,231		
Trinidad	4	1,742	6	4,082	4	3,848	1	1,437					1	955		
Other British West Indies		3,251	1	790	5	4,740	3	5,750			7	2,524				
Cuba	179	44,472	81	53,159	45	43,049	18	25,372	17	50,338	199	62,373	25	32,850	28	126,292
Dominican Republic	45	19,119	8	6,306	16	16,839	2	3,218	1	2,729	18	8,358	2	2,921	2	4,798
Dutch West Indies	2	508	1	678	1	1,118					1	352	1	1,505		
French West Indies						1,014										
Haiti	4	1,440	4	2,966	12	12,203	1	1,332	3	7,729	7	3,067	1	1,417		
Virgin Islands	1	496	1	610												
Argentina	4,328	1,795,136	580	412,264	593	621,235	136	197,438	33	93,801	244	105,812	69	159,172	8	26,841
Bolivia					4	4,504					5	2,786	1	1,508		
Brazil	1,363	412,840	215	167,827	257	262,257	49	74,675	27	79,039	5	2,565	7	7,606	4	13,733
Chile	30	13,083	13	8,687	57	56,319	34	48,860	5	13,417	71	26,450	12	16,004	22	57,869
Colombia	85	36,980	46	33,407	36	37,532	13	19,727	6	16,533	95	34,521	39	53,016	4	14,121
Ecuador	3	1,060									2	1,048				
British Guiana					2	1,946	1	1,525								
Dutch Guiana	5	1,800														
French Guiana									1	2,273						
Paraguay	11	3,840			1	1,014					12	5,808				
Peru	46	18,526	9	7,757	20	20,009	1	1,509	1	4,865	6	2,112				
Uruguay	559	159,484	41	29,310	56	57,973	18	27,472	5	14,589	204	54,756	25	33,816	1	4,123
Venezuela	38	14,957	34	22,879	83	86,344	14	19,871	3	8,187	33	17,276	11	18,533		
Aden	3	1,588	1	722									5	19,721		
British India	13	5,621	100	77,551	89	96,322	11	15,092			147	125,186	6	7,295		
Ceylon	9	2,940	35	27,712	10	9,822	5	7,230			12	7,192	4	5,610	1	1,248
Straits Settlements	48	21,322	87	65,497	38	41,393	4	6,651	1	2,500			15	21,527	3	7,995
Other British East Indies																
China	32	13,368	20	14,329	75	80,588	7	11,049	2	5,149	19	19,487	16	19,300		
Java and Madura			89	64,169	132	129,864	41	61,991	6	15,000	20	14,882	14	14,660		
Other Dutch East Indies			18	12,402	20	19,351					6	5,230	10	19,856		
Hejaz, Arabia and Iraq	12	4,320									2	1,788				
Hongkong	1	300			5	4,681					6	2,112	1	1,561		
Japan	11	2,856	24	18,221	86	85,544	6	9,001	6	18,191			1	1,289		
Kwangtung	21	7,404	1	747			5	6,393								
Palestine and Syria			24	18,283	20	19,933	4	5,785			11	9,296	2	2,149		
Persia																
Philippine Islands	187	74,775	98	75,511	69	73,526	14	20,509	5	13,506	57	25,425	16	21,056		
Siam			4	3,184												
Turkey			1	853	2	2,040										
Other Asia			2	1,153												
Australia	1,081	392,123	1,115	823,597	704	769,479	66	100,112	17	45,546	419	233,411	125	146,391	53	121,351
New Zealand	72	36,354	128	95,860	265	290,380	38	54,345	22	49,848	40	26,633	44	66,474	9	17,317
British Oceania																
French Oceania																
Other Oceania																
Belgian Congo			2	1,529	1	1,159					10	3,520				
British West Africa	5	1,517	4	3,137	14	15,249					7	8,517	56	62,394		
British South Africa	63	30,326	285	213,569	618	680,207	33	47,386			40	31,968	11	14,835	3	9,889
British East Africa	11	5,276	16	13,057	60	69,390	3	5,366	1	2,546	2	949	5	7,948	2	6,015
Canary Islands			9	6,793	2	2,338	4	6,100								
Egypt	100	29,160	12	9,618	12	12,236			1	3,089						
Algeria and Tunis	3	1,404			1	1,182					100	29,500				
Other French Africa	59	16,289	3	2,036	1	1,100	2	2,691			58	21,255	8	7,956		
Liberia	3	1,230											5	2,574		
Morocco	88	31,876	4	2,722	3	3,154					18	6,120				
Portuguese East Africa			6	3,876	18	21,420			1	2,300						
Other Portuguese Africa					3	3,186					8	4,164	1	1,167		
Spanish Africa																
TOTAL	11,222	\$4,099,245	4,177	\$3,027,904	4,578	\$4,834,638	868	\$1,311,715	326	\$881,690	4,057	\$1,893,469	888	\$1,248,994	196	\$588,397

for January, 1926

Canadian Exports

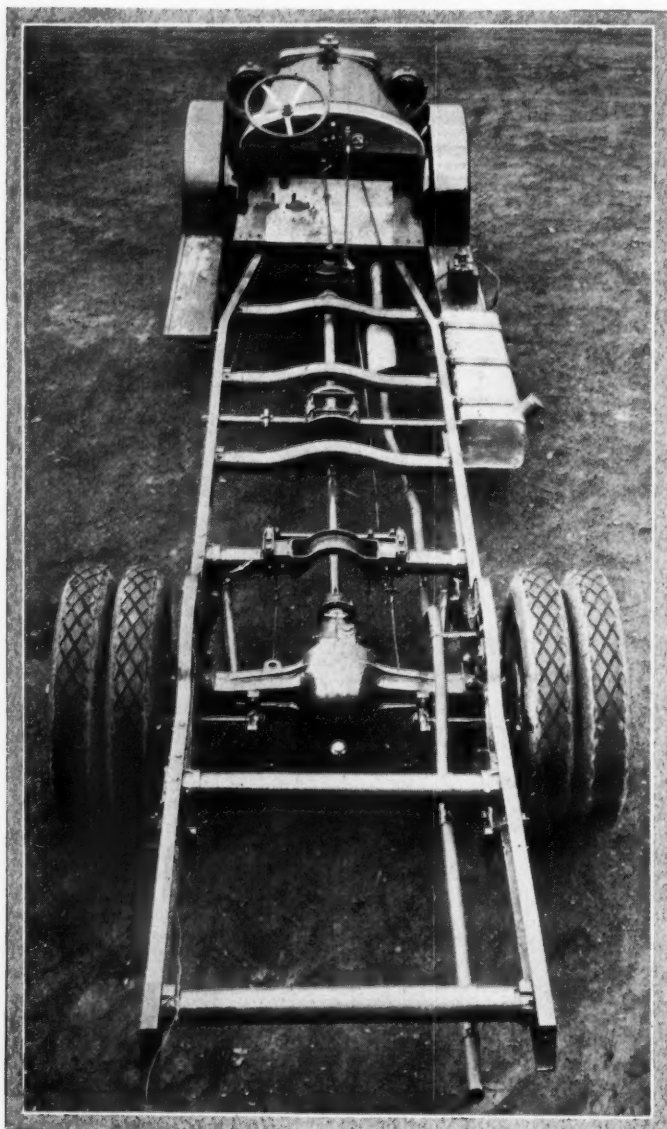
ELECTRIC VEHICLES		PARTS	TIRES						PASSENGER CARS						TRUCKS		PARTS	COUNTRIES
			Casings		Inners		Solids		Up to \$500		\$500 to \$1000		Over \$1000					
No.	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
		\$2,321	231	\$7,522	277	\$1,244	40	\$1,532									Austria	
		61	8	114													Azores and Madeira Islands	
		175,026	1,440	32,278	789	3,198	44	2,745					4	\$4,872		\$61,116	Belgium	
		594	731	16,339	858	2,494	162	9,159	1	420							Bulgaria	
		367,429	1,888	38,469	944	3,057							15	19,428		40,538	Czechoslovakia	
		719															Denmark	
		4,573	1,452	26,934	1,372	4,007						11	7,934	5	5,404		Estonia	
		289,160	2,159	48,450	972	3,112	5	95				5	4,235				Finland	
		66,327	1,326	30,332	381	1,773						3	2,696	9	13,876	608	France	
		10,500	917	15,881	808	2,733	6	161									Germany	
		1,203															Gibraltar	
		223		4,407	302	683											Greece	
		110,362	204	5,681	29	257								3	3,670		Hungary	
		110	30	1,035													Iceland and Faroe Islands	
		624															Italy	
		649															Latvia	
		106,106	1,408	39,440	844	3,559	14	309	3	1,281	1	593					Lithuania	
		13,509	266	5,381	992	2,421	12	844	2	762	18	12,808	6	6,061		596	Malta, Gozo and Cyprus Is.	
		148									3	2,034					Netherlands	
		7,888	546	9,591	577	1,587											Norway	
		3,465	122	2,684	123	417			10	4,181	4	2,712	1	2,036	2	\$834	Poland and Danzig	
		12,379	662	18,373	2,388	8,775	10	1,130									Portugal	
		120,165	1,717	37,252	1,702	4,536	400	14,943					32	51,530		18	Rumania	
		68,264	3,241	67,692	2,427	8,556	87	6,400					7	8,553		65	Russia	
		4,590	577	28,604	515	3,461	1	150									Spain	
		4,217	120	1,313	50	107	21	865					1	936	7	9,198	Switzerland	
2	\$4,547	344,338	18,945	265,044	9,636	23,150	921	27,173			84	73,496	67	95,663	606	108,075	18,019	Turkey
		62,159							2				1	575	1	2,035	3,710	United Kingdom
		718	25	558	10	35			2	805	1	800	2	3,600			1	Irish Free State
		280																Yugoslavia, Etc.
1	2,131	2,174,449	1,085	17,601	539	1,710	57	2,038									81,440	United States
		4,573	124	2,763			2	71										British Honduras
		8,899	182	6,100	170	888												Canada
		3,698	142	4,981	127	676	6	850										Costa Rica
		652	141	3,091	128	427	2	98										Guatemala
		18,650	2,171	40,330	1,414	5,406	80	2,683										Honduras
		8,317	429	7,193	974	7,999	26	1,357										Nicaragua
		153,947	5,583	67,181	5,269	14,634	215	8,426										Panama
		423																Salvador
		9,823	12	92														Mexico
		17,634	44	965	17	79	45	1,397					2	1,365	5	5,598	480	Miquelon, Etc.
		4,413	120	2,049	73	242	16	900					3	2,071			184	Newfoundland
		9,769	63	672	84	263							2	1,657			17	Barbados
		67,696	9,609	117,564	4,881	11,692	866	31,305	2	805								Jamaica
		28,329	328	5,421	570	1,440	19	1,056										Trinidad
		3,867	157	2,880	182	554	3	62										Other British West Indies
		1,199	110	3,246	132	669	14	387										Cuba
		6,364	189	4,472	250	677			8	3,179								Dominican Republic
		1,583	10	197	9	45												Dutch West Indies
		990,765	21,109	253,922	11,804	28,586	603	27,642										French West Indies
		4,494	164	4,922	172	698												Haiti
		225,901	4,093	70,464	3,666	8,476	136	5,182	27	10,206	18	12,282	6	10,898				Virgin Islands
		165,113	855	23,019	778	2,106	44	948	6	2,669	1	510						Argentina
		48,062	1,160	27,514	1,392	5,021	140	7,125	6	2,587	2	1,083	1	1,535				Bolivia
		1,414	84	1,675	267	716												Brazil
		1,885	11	187	14	43												Chile
		88			54	99			5	2,341	2	1,604	1	1,288	10	4,169	484	Colombia
		284							1	438								Ecuador
		51,027	770	20,784	875	3,261	34	2,095										British Guiana
		61,343	3,053	43,322	2,404	5,327	111	5,075										Dutch Guiana
		35,152	1,732	50,100	2,543	10,624	47	6,442										French Guiana
		573	84	1,056	162	375												Paraguay
		62,462	2,431	30,743	703	1,756	794	23,185										Puerto Rico
		11,553	318	9,797	163	481	109	4,825										Uruguay
		43,123	1,090	11,752	10	23	142	3,705										Venezuela
		20,657	2,366	33,021	1,231	13,411	99	2,577										Aden
		36,193	3,110	32,269	730	2,141	460	21,318										British India
		12,908	865	9,875	450	1,932	71	2,808										Ceylon
		3,064																Straits Settlements
		6,200	125	300														Other British East Indies
		168,673	10,030	120,045	9,358	20,459	2,267	42,255										China
		995	65	644	70	141												Java and Madura
		7,928	188	7,674	85	1,323												Other Dutch East Indies
		1,401	12	164														Hejaz, Arabia and Iraq
		56,566	3,144	45,894	3,823	13,235	148	3,895										Hongkong
		408																Japan
		191																Kwangtung
		262,052	2,919	73,316	3,474	10,163	608	31,438										Palestine and Syria
		66,213	599	11,987	204	713	352	12,665										Persia
		1,489	22	302	4	10												Philippine Islands
		560																Siam
		686																Turkey
		12,649	275	5,932	4	16												Other Asia
		90,973	2,909	32,081	554	1,322	126	5,743										Australia
		17,824	154	1,835	61	133	12	125										New Zealand
		15,648	739	13,408	1,000	2,252	84	3,309										British Oceania
		11,685	117	3,189	178	655	135	4,925										French Oceania
		2,001	51	972	51	166	8	338										Other Oceania
		11,556																Belgian Congo
		522																British West Africa
		15,007	75	1,074	56	114												British South Africa
		1,746																British East Africa
		1,455																Canary Islands
		350																Egypt
				</														

Victor Motors Co. Enters Bus Field With Five-Ton Capacity Chassis

Truck maker announces new passenger vehicle powered with 14-H six-cylinder Continental engine.

VICTOR MOTORS COMPANY, East St. Louis, manufacturer of trucks, enters the bus manufacturing field with announcement of Model 80-B, a five-ton capacity chassis, powered with a Continental 14-H six-cylinder bus engine, and having 221-in. wheelbase. Frame side rails are seven inches deep and top of the frame is 23 in. above ground level when loaded.

The frame is reinforced by nine cross members which are all tubular. These cross members are both riveted and welded in cast steel frame brackets to afford a large area of contact with the side rails. Kick-up of the frame over the rear axle consists of electric steel castings riveted and welded to the side rails.



Looking down on the new Victor Model 80-B bus chassis

The Continental six-cylinder engine has $4\frac{1}{2}$ in. bore by $5\frac{3}{4}$ in. stroke and develops 100 hp. at 1650 r. p. m. It is L-head, water-cooled, pressure lubricated and has a seven-bearing crankshaft three inches in diameter. The motor is equipped with a $1\frac{3}{4}$ in. Zenith carburetor, type SV-7, and Eisemann magneto. An eight-inch generator is ordinarily supplied but if the vehicle should be used in fast express or freight work, a five-inch size is fitted.

The radiator is of the cast tank tubular fin type and has a frontal area of 755 sq. in. It is supported on three-point spring suspension and is insulated against vibration. A 35 gal. gasoline tank is mounted outside the frame side rails and is equipped with a long filler nozzle.

Type HU-23 Fuller transmission, mounted integral with the engine, furnishes four speeds forward and reverse. Teeth on all gears are ground and checked on a profile testing machine. The clutch is multiple disk serrated tooth type with 23 wearing surfaces.

Steering gear is of the screw and nut variable type with five square inches of bearing surfaces and is controlled by a 22 in. diameter steering rim mounted on a five arm aluminum spider.

The service brake is mounted on the transmission and the emergency brakes are internal mounted on the rear wheels.

Semi-elliptic springs are used front and rear. The front ones consist of nine plates, three inches wide, and are 44 in. long. They are equipped with oversize hydraulic shock absorbers and bumper. Rear springs are 60 in. long, 4 in. wide and consist of 20 plates so arranged that three ranges of flexibility are obtained automatically.

Drive is by means of ball and socket, non-adjustable type radius rods. Rear axle in double reduction, full floating type and is a combination spiral bevel and spur tooth gear. All shafts and gears are made of triple heat treated alloy steel and the differential side cases are drop forged. The axle is $2\frac{1}{4}$ in. diameter and its ends are secured in the differential side gears by ten-splined fittings. The differential is a four-pinion, bevel-gear type and the assembly is so attached to a single casting that it is claimed their alignment can never be affected by loads or torsional strains.

Disk wheels carrying 38 by 7 in. cord tires are standard equipment, with dual tires on rear. Tires are mounted on Firestone Type B demountable rims. Front tread is $64\frac{1}{2}$ in. and rear 75 in.

On direct drive the passenger chassis has a gear ratio of $4\frac{1}{3}$ to 1, providing a maximum speed of 60 m. p. h.

Standard equipment includes Alemite high pressure lubricating system, front bumper, front hydraulic shock absorbers, electric lighting and starting system with drum headlights and individual dimmer and driving lamps.

EDITORIAL

Sales and Stocks

BOTH new and used car sales have been running well ahead of last year. There can be no doubt about this despite discrepancies in figures which make accurate quantitative statements somewhat difficult.

Stocks in dealers' hands are considerably higher as well. A recent survey indicates that both new and used car stocks are something like 25 per cent higher than they were at this time last year. Higher stocks are justified, of course, by the increased rate at which sales are being made, the increases ranging in some cases as high as 30, 40 and 50 per cent ahead of the first three months of 1925.

It is well to bear in mind, however, that total production for the whole year of 1926 is not going to exceed that of 1925 by anything like 30 per cent. If it did, we would build about 6,000,000 vehicles this year. Even the most optimistic don't expect any such total. Consequently, the rate of sale in the last nine months of the year is likely to be ahead of last year by a considerably smaller margin than in the first three months.

And since stocks on hand must be considered high or low in the light of future sales rather than in the light of past sales, current stocks in dealers' hands appear relatively high, in some lines particularly.

Profits Built on Volume

WOOLWORTH pioneered the principle of volume sales with small profit per sale in merchandise. He grew rich. Ford applied the same principle to the production and distribution of automobiles. Practically every other automobile manufacturer in the country today operates on that idea, cutting prices as much as possible in order to increase the volume of sales, thereby increasing production and decreasing unit manufacturing costs. The profit per sale is smaller, but production costs are lower and more sales are made, so that in the end the net total profit is larger. This policy accounts for the popularity of the motor car in the United States and the prosperity of the automobile industry.

Building profits on high volume rather than high prices has been tried and found successful in nearly all other branches of industry and commerce. As several Englishmen stated recently on their return home after a trip to the United States, "America is prosperous because she believes in small profits and quick returns and the accumulating of wealth by fine margins and immense and rapid turnovers."

New evidence of the universal applicability of this principle comes to light this year with the publication of the annual reports of the two leading steel corporations, U. S. and Bethlehem. In the steel industry 1925 prices were materially lower than in 1924, yet

both of the corporations mentioned showed much higher net earnings in 1925 as a result of doing "a substantial increased volume of business," to use the words of Judge Gary in the U. S. Steel report.

The point that stands out is that the steel companies did not suffer by reducing prices, despite the fact that Judge Gary referred to "an aggregate decrease in gross sales proceeds of \$51,500,000," because the 1925 products of U. S. Steel were not sold on the basis of 1924 prices. The actual net income of U. S. Steel was five and a half millions in excess of 1924. Bethlehem's net return exceeded the 1924 figure by about four millions. The steel companies did not receive as large a price per ton, but they found a wider market for their products by reducing the price and made more profit by selling more tons.

Grand Prix in the Balance

FROM recent reports from abroad it would almost seem as though the "classic" Grand Prix race of the Automobile Club of France would not be run this summer. Racing as a means of sales propaganda has been kept alive in Europe chiefly by a few firms manufacturing rather expensive cars, for which they have to seek a market among the wealthy classes and it seems that even these are now beginning to doubt whether the game is worth the candle.

Up to the preliminary closing date entries of three cars each had been received from only two manufacturers. The organizer, the Sports Committee of the A.C.F., is therefore in a quandary. The race cannot be cancelled because it was announced in the regular way by the mailing of Rules and Regulations, in which, contrary to the usual custom, the right to cancel was not reserved, and if the event is called off it will give the firms which have gone to the trouble and expense of building cars and organizing racing teams good grounds for recovery. On the other hand, if the race were run with virtually only two competitors, it would certainly not prove a big attraction.

It seems that the Sports Committee will make one more attempt to get a satisfactory number of entries. A meeting of all of the automobile writers of Paris was arranged by it, at which the "scribes" were asked to lend their assistance to the Committee in "putting over" the event. The papers probably are willing enough to help, but whether their assistance will be of much avail at this late hour is more than doubtful.

The fact of the matter is that competition between makers in Europe is getting keener all the time, and the profits remaining hardly are sufficient to warrant such heavy expenditures as are necessitated by competition in a first class race, especially if the advertising results of success are in doubt. Holding the race at a great distance from the French capital may have further lessened its value in the eyes of prospective competitors.

AUTOMOTIVE **NEWS SECTION** INDUSTRIES

Philadelphia, Pennsylvania

Thursday, March 25, 1926

Tendency to Curtail Noted in Production

PHILADELPHIA, March 25—Signs of a slackening in automotive production are observable for the first time in weeks. The curtailment indication is not widespread or heavy enough to affect greatly the daily total output at factories but is significant as showing a reversal from the tendency formerly noted. It seems generally agreed that the expansion of production has gone far enough and from this time on must be subordinated more strictly to retail movement. There is a considerable accumulation of stocks in which dealers in practically all lines of cars share, and it is apparently agreed that these stocks must be reduced.

The belated arrival of warm weather has held up retail sales to some extent, but the conditions now appear favorable for a heavy turnover. The retailers in general have large numbers of orders for later delivery, and these sales should now become actual. There have been periods in other years, of course, when forward orders failed to be realized, but merchants and manufacturers see no reason why this should be the case this year.

Truck and bus production and sales are continuing at record levels for most of the manufacturers. This branch of the industry never had a better outlook than it has now. The new attitude of many of the largest railroads of the country toward trucks and buses is proving of immense benefit. Not only have attacks on truck and bus operation been discontinued, but the railroads in many instances have programs for replacement of short haul freight and passenger lines more extensive than is generally realized.

Oppose Unsound Terms

Aside from the heaviness, in some quarters, of new and used car stocks, the position of the automotive industry is unusually sound. A reaction against undue liberality in time-sales terms has definitely set in, and dealers as well as manufacturers and the better finance companies are all united in opposition to unsound terms. Although local competitive conditions still rule to some extent, it is unquestionably a fact that better judgment is being exercised in most sections of the country. The alarming growth of repossessions in the late fall and early winter was the prime reason for the tightening of terms.

Haddon with Copeland

DETROIT, March 24—C. W. Haddon, general sales manager of Velie Motors Corp., and formerly with Maxwell and Chrysler, has been appointed to the executive staff of Copeland Products, Inc.

Dodge Sales Reach New Weekly Record

DETROIT, March 23—All weekly retail sales records for Dodge Brothers were broken during the week ending March 20, it was announced by the company today. During the week 7,223 Dodge Brothers cars and Graham Brothers trucks were delivered by dealers in the United States. This is 693 better than the best previous week, which was the week ending April 11, 1925.

Because of this demand and also because stocks in dealers hands throughout the country are said to be exceedingly low, it is reasonably certain that daily factory output of 1500 cars will soon be increased.

Since Jan. 2, this year, and up to March 20, Dodge dealers have delivered 53,293 vehicles as compared to 38,714 for the corresponding period last year. Retail orders taken during the last week and not filled amounted to 7,927, it was announced.

Ford of Canada Plans Separate Tractor Sale

NEW YORK, March 23—According to reports received here, Ford Motor Co. of Canada, is planning to separate its tractor from its automobile business, with the tractor business to be operated under a new organization, the Power Equipment Co. of Canada, Ltd., which, it is understood, will utilize the sales organization of the Ford company.

Heads Gardner Sales

ST. LOUIS, March 23—Col. Halsey Dunwoody, formerly vice-president of the Finance & Trading Corp., of New York, was appointed vice-president and general sales manager of the Gardner Motor Co., at a meeting held here yesterday.

FEBRUARY OUTPUT SHOWS INCREASE

WASHINGTON, March 22—The Department of Commerce today announced February production of motor vehicles in the United States and Canada as 334,527 passenger cars and 40,805 trucks, of which 318,632 passenger cars and 37,522 trucks were made in the United States.

The table below is based on figures received from 177 manufacturers for recent months, 70 making passenger cars and 124 making trucks (17 making both passenger cars and trucks). Data for earlier months include 70 additional manufacturers now out of business, while February data for 12 small firms, mostly truck manufacturers, were not received in time for inclusion in this report. Figures on truck production also include fire apparatus, street sweepers and buses.

	1925		
	Cars	Trucks	Total
Jan. ...	212,921	28,141	241,062
Feb. ...	252,803	34,410	287,213
2 Mos.	465,724	62,551	528,275
Mar. ...	332,154	45,098	377,252
Apr. ...	391,302	47,823	439,125
May ...	382,714	43,307	426,021
June ...	364,806	38,056	402,862
July ...	358,554	41,840	400,394
Aug. ...	221,831	37,770	259,601
Sept. ...	272,425	60,374	332,799
Oct. ...	406,572	45,914	452,486
Nov. ...	336,358	40,001	376,359
Dec. ...	285,199	34,373	319,572
Total	3,817,639	497,107	4,314,746
	1926		
Jan. ...	283,263	32,629	315,892
Feb. ...	334,527	40,805	375,332
2 Mos.	617,790	73,434	691,224

403,000 Production in March Indicated

DETROIT, March 23—Due to weather uncertainty in the northern and north-eastern states, the total passenger car and truck output in the United States and Canada for March is somewhat difficult to estimate.

Indications are there will be between 63,000 and 67,000 carloads shipped this month. Approximately 50,000 of this number will be from plants in Michigan, Illinois and Wisconsin.

Should there be no radical changes in the present output, it is likely that the output will be around 403,000 passenger cars and trucks. This will be approximately 28,000 more than for February and will be a record for March.

Safety Conference Favors Model Laws

Approves Standard Tail Lights and Votes Down Minimum Speed Provisions

WASHINGTON, March 24—The National Conference on Street and Highway Safety, meeting here this week, approved model laws for the states covering registration and certificates of title; operators' and chauffeurs' licenses and regulating vehicle operation on the highways. In attendance at the conference were representatives of organizations interested in the safety movement and delegates from 43 states, the whole group numbering over 1000.

The recommended legislation most closely affecting the automobile industry was a provision in one of the laws requiring yellow or red tail lights, the purpose being in time to supplant red tail lights with yellow lights, retaining the red only as a stop signal. A lively debate over this section was led by H. L. Horning, president of the Motor and Accessory Manufacturers Association, representing the S. A. E. at the conference and by H. D. Brown, of Detroit, but it was finally approved by a vote of 147 to 129.

It was also voted after some discussion to permit license plates to remain with the owner instead of following the car and not to permit the display or issue of temporary license tags. Several provisions favorable to car renting systems were also embodied in the model laws. Speed limits were finally fixed at 20 miles in the cities and 35 on the open highways, with certain modifying conditions. Efforts to introduce minimum speed provisions were turned down by a substantial majority.

Mr. Horning, in an earlier talk, detailed some of the improvements in motor car construction during the last year which have contributed to safety in operation, including the reduction or elimination of obstructions to the driver's view and he told of research aimed at obtaining better headlighting. George M. Graham, representing the National Automobile Chamber of Commerce, was chairman of the steering committee of the conference, which drafted a composite report embodying the main recommendations of the various other committees.

Truck-Bus Hearing Opened by Senate

WASHINGTON, March 23—The first hearing of the Federal bus and truck regulatory bill (Senate 1734) was held yesterday morning before a joint committee of the House and the Senate with Senator Watson, of Indiana, acting as chairman. The proponents of the bill were given the first opportunity to speak. John E. Benton, general solicitor of the National Association of Railroad and

Utilities Commission, reviewed the conditions which led up to the drawing of the bill and briefly outlined the bill itself. The opinion was voiced that the Interstate Commerce Commission should not be saddled with any additional regulatory burdens.

Samuel R. Lipp, representing the Ohio association of commercial haulers, told the committee that there were only 400 to 500 buses in the entire country operating in interstate service.

Republic Presents New Two-Ton Line

ALMA, MICH., March 22—Republic Motor Truck Co., Inc., is now in production on a new two-ton truck known as Model 15 which replaces the former 11X. The complete line now consists of eight trucks ranging in capacity from 1½ to 5 tons and two bus chassis.

Among the improvements in the new Model 15 are: a heavier and deeper frame, the side channels being of ¼ in. stock, 6 in. deep with 2½ in. flanges. Solid tires, 34 x 4 in. front and 34 x 6 in. rear are regular equipment but pneumatics may be obtained at extra cost. Springs are longer and wider, those in front now being 39 x 2½ in. and in the rear 54 x 3 in. Larger eyes with replaceable bushings are used throughout. Between the rear spring brackets there is a tie-bar which, however, does not replace the shackle bolts. The service brake is mounted on the front propeller-shaft at the center bearing support and consists of a single laminated drum with two wide shoes. The standard wheelbase is 153 in. with 173 in. available and the engine is a 4 x 5 in. Waukesha with a 3¾ x 5 in. Continental optional.

Models 15, 25, 30 and 35 have the new Republic radiator which has a polished aluminum top tank surmounted by the Republic shield.

The new clear vision Republic open and enclosed cabs are available for the entire line. The new cabs have narrow posts and wide glasses with quarter glasses on each side. The doors are wide and the seat is in two pieces so that the gas tank may be filled without the driver's leaving his position.

Dodge Brothers Low on Detroit Bus Bid

DETROIT, March 23—Bids on 125 motor coaches which the Detroit Street Railway is planning to purchase for use in the city were opened today. Four companies submitted estimates, with Dodge Brothers lowest.

The companies bidding and their estimates per bus follow: Dodge Brothers, \$13,360; Yellow Coach Co., \$13,675; Fageol Motors Co., \$14,136; Cummings Car & Coach Co., \$14,326. Prices include tires and the government tax.

In asking bids, the D. S. R., reserved right on 300 additional buses at prices quoted.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, March 25—Stock prices, after a fortnight of relative stability, again turned downward last week, while commodity prices were firmer than they had been for some time. Industrial activity is well sustained. Although severe weather has interfered with trade, the recession has apparently been moderate, and present levels approximate those of a year ago.

CAR LOADINGS

Car loadings of revenue freight continued above last year's level during the week ended March 6, when the total was 964,681 cars, as compared with 912,658 in the preceding week (a holiday week) and 932,044 in the corresponding period last year. Loadings for the year to date number 9,073,149, as against 9,012,040 a year ago.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended March 17 were 4.9 per cent above the total for the preceding week and 9.6 per cent above that of a year ago.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 153.6 last week, as against 153.3 a week earlier and 155.5 three weeks earlier. The wholesale price index of the Bureau of Labor Statistics declined from 156 in January to 155 in February.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve banks declined \$56,999,000 during the week ended March 17, with decreases of \$21,800,000 in discounts, \$27,400,000 in open market purchases and \$7,100,000 in Government securities. Note circulation declined \$12,500,000 and deposits \$16,600,000, while reserves increased \$13,800,000. The reserve ratio rose from 74.6 to 75.6 per cent.

Loans of reporting member banks secured by stocks and bonds declined \$121,000,000 during the week ended March 10. Loans secured by Government obligations decreased \$5,000,000, while "all other" loans gained \$31,000,000. Investments increased \$3,000,000, while borrowing from Federal Reserve banks declined \$79,000,000 and net demand deposits \$113,000,000.

MONEY

Money rates in general were somewhat lower last week. The rate on call loans was 4¼ per cent, which compares with 4 to 4½ per cent in the preceding week. Time loan rates were 4¼ to 4½ per cent, as against 4¼ to 5 per cent a week earlier. Rates on commercial paper were unchanged at 4¼ to 4½ per cent.

Omaha Zone Leads in Chevrolet Sales

Retail Deliveries for Country
in February Runs Ahead
of Factory Quota

DETROIT, March 22—Upwards of 32,500 cars, the largest number ever sold in any February, were delivered by Chevrolet dealers during the last month. The quota set for the 30 sales zones of the company based on a conservative examination of prospective February demands was 22,002. The increase in sales for the month was 147.7 of the quota.

Additional changes in the March output from the originally announced schedule of 54,553 will bring the production up to 59,244. This does not include the 4367 cars to be built at the Chevrolet Canadian plant at Oshawa, Ont.

The Omaha zone, established three months ago, led the zones during February in exceeding their allotment. It had a percentage of 398.3. Minneapolis zone was second with 304.9; Oklahoma was third with 255.4, Atlanta fourth with 249 and Des Moines fifth with 243.8, Omaha also led the zones in January with a gain of 275.4 per cent of its quota for that month.

Of the six sale regions, the Great Lakes region led in February, with the middle west, southeastern, Flint, Atlantic Coast and the Pacific Coast regions in the order named.

New Standard Forgings Takes Over Companies

CHICAGO, March 22—Standard Forgings Corp. of Delaware has been organized to acquire the Standard Forgings Co. with plant at Indiana Harbor, Ind., and the St. Louis Forgings Co. with plant at East St. Louis, Ill., and the South Chicago plant of the Pollak Steel Co. The Indiana Harbor plant has been producing heavy forgings for the automotive and other industries, which work will also be carried out in the South Chicago plant. With the increased facilities it will be one of the largest producers in the country. G. E. Van Hagen is president and general manager; C. R. Lewis, vice-president and general sales manager, and L. C. Ryan, vice-president and treasurer, these officers also comprising the directorate. John L. Bender, who has represented the Pollak Steel Co. in Detroit, will represent the new organization there.

Auburn Gets Trains

AUBURN, IND., March 22—Due to the great increase in production of the Auburn Automobile Co., the Pennsylvania railway has put on two special freight trains daily to handle outgoing and incoming shipments.

This special railway service enables all cars loaded to be moved from Auburn the same night. The production schedule of the Auburn plant is being increased rapidly.

RAKISH WINDSHIELD FEATURES GARDNERS

ST. LOUIS, March 19—Gardner Motor Co., Inc., is now in production on new six and eight-cylinder open models, designated as "Air-coasting" phaetons, which are priced at \$1395 and \$1795 respectively.

The one-piece windshield is set at a rakish angle and the collapsible top has natural-finish wood bows. The upholstery is leather and harmonizes in color with the polished two-tone lacquer finish. A novel method of trimming eliminates most of the seams and joints, and makes possible a neatly finished appearance. Individual seat cushions are provided front and rear and in the eight-cylinder model, an easily removable arm rest is mounted at the center of the rear seat.

Production of these models is under way and shipments are being made.

Peerless Company Adds Two De Luxe Sedans

CLEVELAND, March 19—Peerless Motor Car Corp. has added de luxe five and seven-passenger sedans listing at \$2795 and \$2995 respectively on the 133-in. wheelbase chassis of its larger six-cylinder line, the 6-72. An option of Brewster light green, Ohio blue or Tudor gray is offered on these models. They are finished entirely in lacquer including fenders, aprons, etc., with bumpers, bumperettes and Winterfronts finished to match the body color. Upholstery is mohair velour. Walnut panels are inlaid in the doors. The instrument board has a walnut finish. Accessory equipment furnished on other 6-72 models also is standard on these new sedans.

Diana Prices Change

ST. LOUIS, MO., March 22—Price increases of \$100 each have been announced by the Moon Motor Car Company on the Diana straight eight roadster and cabriolet. At the same time the price of the deluxe 5-passenger 2-door sedan has been reduced \$100 and the price of the 4-door deluxe sedan increased \$200. Following are the old and new prices:

Model	New Price	Old Price
Roadster	\$1795	\$1695
4-door DeLuxe Sedan	2195	1995
Cabriolet	2095	1995
2-door DeLuxe Sedan	1995	2095

Roamer Builds Eight

KALAMAZOO, MICH., March 22—Roamer Motor Car Co. has brought out an 80 hp., 128-in. wheelbase, straight eight model. Three body styles—five-passenger sedan, two-passenger coupe and two-passenger sport roadster—are offered on the new chassis, all listing under \$2,000.

Believe Change Set on Rubber Releases

New York Market Has Quiet
Week—Conservation Cam-
paign Pleases Hoover

NEW YORK, March 20—Crude rubber market closed rather easier after a generally quiet week, in which the most interesting news was the report that Colonial Secretary Amery, in the British House of Commons, said he hoped to be able to make a public announcement, possibly in about a fortnight, regarding release of crude rubber under the Stevenson restriction scheme. It is assumed here that this means some change in the amount of rubber releases.

Secretary Hoover, addressing export interests here, again discussed the rubber situation and expressed satisfaction with the effects of the rubber conservation campaign in the United States.

In London, Eric Miller, former chairman of the British Rubber Growers Association and a member of the committee which formulated the Stevenson plan, told the American Chamber of Commerce that he considered the Hoover efforts to arouse American interest in the importance of the rubber industry as entirely proper. He expressed amazement that the United States, consuming two-thirds of the world rubber production, was represented by only 2½ per cent of the capital invested in the industry.

Defending the Stevenson plan, he denied that the members of the British committee which visited the United States in 1923 had pledged unlimited supplies at prices ranging from 30 to 36 cents a pound, and he insisted that there was no violation of the law of supply and demand when the power of securing the supply of a product was put into the hands of the buyers alone.

Reports of an agreement by producers in London, not to sell rubber below 30d., have contributed largely to the deadlocked position of the market here.

Eclipse Gets Patents

ELMIRA, N. Y., March 22—Patent rights held by the Westinghouse Electric & Mfg. Co. on starting, lighting and ignition systems for automobiles have been purchased by the Eclipse Machine Co. of this city according to Edward J. Dunn, president of the Eclipse company. Present plans of the Eclipse company are unaffected by the change.

American Welding to Meet

NEW YORK, March 23—The annual meeting of the American Welding Society will be held at the Engineering Societies building here April 21-23.

On the morning of the 22nd design of welded joints in the automobile industry will be the topic with papers from engineers representing some of the larger automobile manufacturers.

Winter Parts Work Reduces Hudson Net

First Quarter of Fiscal Year
Under 1925—Second Quar-
ter Promising

DETROIT, March 20—Hudson Motor Car Co., for the first quarter of its fiscal year—ending February 28—reports net profits of \$2,746,023 or \$2.06 a share on the 1,330,050 shares of no par capital stock and comparing with \$3,826,932 or \$2.89 a share on the 1,320,050 shares outstanding in the corresponding quarter a year ago. Net profits in the 1924 quarter were \$1,301,363.

The decline in the company's net earnings has occurred in face of the fact that a substantially larger volume of cars were shipped in the first fiscal quarter this year than during the same period last year.

A large increase in profits is predicted for the current quarter, since during March, April and May profit from sales of many cars actually manufactured during the winter will be realized. During that period actual production of cars for shipment is understood to have been reduced, but about the middle of February, in anticipation of the spring sales peak, the company began assembly of cars at a high rate from parts manufactured earlier.

Net earnings for the first fiscal quarter reflect the company's general plan during the winter of making up a surplus of chassis parts for assembly during the spring selling season.

Mason Tire & Rubber Nets Profit of \$576,586

AKRON, March 20—For the first time since 1922, the annual report of the Mason Tire & Rubber Co. reveals a net profit for operations during 1925.

The company's tire fabric mills at Kent and in the south operated most of the year at capacity.

Net sales totaled \$9,436,567 and net operating profits, after allowing \$218,146 for depreciation, were \$576,586. After allowance for bond interest of \$150,000 and \$260,625 charged off for obsolete equipment, \$165,960 was carried to surplus.

W. J. Beckley, of Ravenna, succeeded R. S. Hyney, of Chicago, on the board of directors. Other directors were re-elected. H. P. Shupe, of Cleveland, was elected executive vice-president, while W. A. Cluff was elected treasurer, in addition to his duties as president. John H. Diehl and C. H. Williams were reelected vice-presidents and George L. Morse was re-elected secretary.

Stutz Adds Dealers

INDIANAPOLIS, March 22—Five new distributors and 30 dealers have been added by Stutz Motor Car Co. of America, Inc., since March 1. The company has upwards of 3000 orders.

FORD HIGHLAND PARK TO WEAVE FABRICS

DETROIT, March 22—The development of the cloth making industry within the Ford Motor Company which will produce more than 3500 yards of fabric for upholstery on Ford closed cars, has been announced by the company. The manufacture of cloth, which was carried on by the company in an experimental way for some time, has reached a daily output of 300 yards and by the first of August should reach 3500 yards per day production.

According to the announcement six looms are in use in the cloth making department located in the Highland Park plant. To reach the contemplated production by the end of summer 74 more looms will be installed. At present more than 22,000 yards per day are needed on the closed models.

Although present equipment permits only the use of scoured wool, special machinery has been installed to accommodate raw wool. The greater part of the wool requirement will be supplied by Michigan flocks.

Fleetwood to Make Cadillac Specials

DETROIT, March 22—The Cadillac Motor Car Co. has completed arrangements with Fleetwood Body Co. for the building of nine custom body styles upon individual order.

The nine body styles which embrace both chauffeur and owner-driven types are an inside drive limousine for seven passengers, a limousine brougham for five passengers, cabriolets or town cars, one for four passengers in two-body styles, an inside drive cabriolet for four passengers and an inside drive collapsible cabriolet for seven passengers also built in two body styles. Additional seats in the town cars are of the opera style and cars with exposed driver's seats are equipped with glass side wings opening with the doors.

The bodies, it is said, reflect the changes which will take place in custom coach work during the coming season. The bodies are low, with the narrow molding almost universally used. An unusual variety of colors is offered while the interior upholstery will be selected to match the color of the exterior.

Achilles Property at Auction

BINGHAMTON, March 20—The First National Bank of this city, trustee under the \$250,000 general mortgage bonds of the Achilles Tire & Rubber Co., has announced that the property covered by the mortgage would be sold at auction April 2 at the office of the bank here.

The property was bid in by the trustee at the foreclosure sale on June 21, 1924.

Peerless Returns to Strong Position

Report for 1925 Shows Profit
Despite New Model Development Cost

CLEVELAND, March 22—The Peerless Motor Car Corp., of this city, under the management of Edward Ver Linden, president, has changed a deficit into a net profit, according to the annual report. Net loss of \$1,694,177 in 1924 has been changed to a net profit of \$126,804 in 1925. The present management of the company assumed office in February of last year, and during the nine months beginning April 1 and ending Dec. 31, reported a net profit of \$407,318. In the first quarter of 1925 there was a deficit of \$280,514.

All the expense of bringing out the new models of 1925 was absorbed in that year. Net sales during 1925 were \$17,352,539 and the gross profit after deducting \$14,399,643 of general expenses and \$195,024 depreciation was \$2,757,872. Mr. Ver Linden stated that notwithstanding the company put on the market two new lines of cars during 1925, the year was closed with no funded debt or bank loans, and with a ratio of quick assets to liabilities of 4.3 to one.

He says that one of the greatest additions to the assets of Peerless during the past year was the expansion of the dealer organization and of distributors. The distribution organization was enlarged by the addition of some of the most successful merchandising men in the country, and this assures a constantly increasing market for Peerless cars. Economies in manufacture and distribution enabled the company to make substantial reductions in prices of cars.

The balance sheet shows that bank loans of \$418,287 on the 1924 report have been eliminated while cash item totals \$578,371 against \$728,000 a year ago. Used cars are carried at \$258,109 as against \$344,154 the previous year.

Peerless produced 6719 cars last year of which more than 1000 were built in December, following the completion of one of the new models. The plant is now geared up to produce 100 cars a day, and recent shipment have been running 45 to 60 cars a day.

Kokomo Plant Sold

KOKOMO, IND., March 20—Sam Fulton, of the Fulton Company, Milwaukee, Wis., and Neil T. Albright, of this city, have purchased control of the Kokomo Automotive Mfg. Co., makers of automobile accessories and similar devices, it is announced here. By terms of the sale, pending legal action over a disputed acquisition of stock is dismissed. Albright has been secretary and general manager of the concern since it was organized and the Fulton company has been exclusive sales representative for several years.

Men of the Industry and What They Are Doing

Studebaker Names Vance to Succeed Wollering

H. S. Vance has been appointed by the executive committee of the Studebaker Corp. of America to the post of vice-president in charge of manufacturing to succeed M. F. Wollering, resigned.

Mr. Vance began with Studebaker as a mechanic apprentice at 15 cents per hour, and successively has held the posts of inspector, storekeeper, general storekeeper, supervisor of specifications and stores, assistant treasurer, purchasing agent, assistant to the vice-president in charge of manufacturing, assistant to the president, export sales manager and sales manager, which latter position he leaves to accept his present appointment.

It is expected that Mr. Vance will be elected a director of the corporation at the annual meeting April 6.

Mr. Wollering is retiring from the corporation after seventeen years of faithful and efficient service, with the best wishes of the directors and management.

Russell Huff Resigns

Russell Huff, director of engineering for Dodge Brothers for the past several years, and closely identified with Dodge Brothers engineering matters for the past ten years, has resigned. Previous to this connection he had been with the Packard organization for fifteen years. Following his resignation, Mr. Huff left for a vacation in the west following which he will announce future plans. Mr. Huff was president of the S. A. E. in 1916, and has been a prominent figure in its activities.

Parsons with Auto Body

Charles P. Parsons has been made sales manager of the Auto Body Co. of Lansing. Mr. Parsons served for some time with the Fisher Body Corp. and later became vice-president of the Ternstedt Mfg. Co.

R. P. Aull Joins Overland

R. P. Aull, formerly sales research director for Dodge Brothers, has joined the sales department of Willys-Overland, Inc. Mr. Aull is widely known as a sales analyst and was a leading figure in the Dodge Brothers sales organization for a number of years.

Edwin F. Hill, Jr., Joins Flint

Edwin F. Hill, Jr., has been appointed special factory representative in the field, according to announcement by R. H. Mulch, vice-president and general manager of the Flint Motor Co.

Roscoe Joins High Speed

Scott Roscoe has resigned as mechanical engineer at the Franklin plant to take up new duties with the High Speed Hammer Co., Rochester.

Continental Awards

Old Timer Medals

Five hundred and twenty-five employees of the Continental Motors Corp., who have been with the company continuously for five years or more were presented with gold service emblems at an "Old Timers" party held Thursday evening at Annunciation Community House, Detroit.

Twenty-nine members of the organization received diamond studded emblems as the result of fifteen to twenty years service with the company. One hundred ten persons were presented with ruby studded emblems designating ten to fifteen years service and three hundred and ninety people received emblems for from five to ten years service.

Thomas M. Simpson, secretary of the corporation, made the presentation speech and was followed by Col. George W. Blackinton, works manager, and V. M. Smith, general superintendent, who outlined a little of the history of the company.

A buffet supper and dancing followed the presentation of the emblems.

J. G. Gammeter on Leave

John G. Gammeter, whose inventions in the last twenty-five years have contributed greatly to the remarkable progress made by the tire and rubber industry, has been granted a leave of absence from the B. F. Goodrich Co., to devote more time to his personal affairs. He has been chief of Goodrich consulting engineers for many years. More than 200 patents have been taken out by Gammeter, covering every phase of the industry. He is one of the most widely known development engineers in the country.

E. T. Klee Gets Promotion

E. T. Klee has been made assistant production manager of Stutz Motor Car Co. of America. Starting with the company in 1912, Mr. Klee has held various positions in the purchasing and production departments and for the past year has done special work toward production of the new Stutz models introduced this year. His new duties will give him charge of coordinating materials and of the record division of this department.

H. B. Burr Buys Control

Harry B. Burr has purchased the interest of Mr. Fowler and Mr. Kellogg in the Burr-Fowler Co., Inc., manufacturers of automotive and radio equipment at Syracuse, N. Y., and will continue to run the business under the same name for the present.

F. E. Titus Takes Over Goodrich Eastern Sales

F. E. Titus, vice-president in charge of sales of the International B. F. Goodrich Corp., export organization of the B. F. Goodrich Rubber Co., has just taken up his new duties as Eastern district manager for the latter company, with headquarters in New York.

Mr. Titus formerly served as Goodrich branch manager at Buffalo, and also at Pittsburgh. He was later manager of foreign sales, being stationed in New York. He then became sales manager and finally vice-president of the export corporation.

George Sawin, former New York district manager, has been transferred to Chicago as district manager.

Name Altoona Officers

Frank P. Cramer, local automobile garage and racing car owner and prominently known as an authority on practical motor construction, has been re-elected president of the Altoona Speedway Association. Mr. Cramer has headed the speedway since its construction three years ago.

Other officers elected for additional terms are: L. E. Frey of Penn Motors, Inc., vice-president; E. L. Shellenberger of G. M. S. Motor Co., secretary; and R. P. Good, Willard battery distributor, treasurer. Directors, reelected for the ensuing year, are R. E. Fluke, W. P. Cettman and W. A. Morgan.

Rosborough Joins Moline

Caldwell R. Rosborough, who has been secretary of Williams, White & Co. and Moline Forge, Inc., with which he has been identified 26 years, has resigned to become secretary of the Moline Tool Co. Wilson P. Hunt, president of the latter company, in making the announcement said that the change will make it possible for him to devote a greater time to the development of the Hole Hog line of implements of Moline Tool. Mr. Rosborough will continue as director of Williams, White & Co.

H. W. Getz, general manager of Moline Forge, Inc., has been named his successor as secretary with Williams, White & Co. and Moline Forge, continuing also his managerial duties of the latter company.

De Forest in New York

Graybar Electric Co. announces the appointment of W. B. De Forest as sales manager of its New York office. Mr. De Forest previously was Kansas City branch manager and brings to his new position the benefit of 17 years' experience with the Western Electric Co.

Hildenbrand Joins Watson

Kenneth W. Hildenbrand has taken over factory sales representation in the Central Atlantic States for the John Warren Watson Co.

Financial Notes

Rolls-Royce of America, Inc.—Aldred & Co. and Minsch, Monell & Co. are distributing a block of \$1,000,000 Rolls-Royce of America, Inc., 7 per cent sinking fund gold bonds, due in 1937 at par and interest. The offering does not increase the company's outstanding indebtedness and is part of a total of \$2,000,000 bonds dated Sept. 1, 1922. In connection with the present offering a statement by the Rolls-Royce management places the American company's production schedule for 1926 at 500 cars.

White Motor Co. stockholders have authorized an increase in capital stock from \$25,000,000 to \$50,000,000. Of the increase \$15,000,000 will be issued soon, one-third of which will be paid as a stock dividend to stockholders of record March 25, the remainder to be offered at par to stockholders of same record. Warrants giving the right to subscribe to this new stock will be mailed about March 27 and are payable at the Irving Bank-Columbia Trust Co., New York City, transfer agents, on or before April 10.

Kelsey Wheel Co., Inc., for 1925 reports net income \$1,357,248 equivalent after preferred dividends to \$11.99 a share on the 100,000 common shares and comparing with \$1,118,369 or \$9.49 in 1924. Net sales were \$15,083,090 compared with \$14,856,825 in 1924 and \$20,078,434 in 1923. Surplus, which fell from \$984,934 in 1923 to \$349,704 in 1924, increased to \$599,220 in 1925.

Goodyear Tire & Rubber Co.—Dillon, Read & Co., as sinking fund agent for this concern's first mortgage 20-year 8 per cent sinking fund gold bonds, announces that notice has been received from the Union Trust Co. of Cleveland, as trustee, that it has designated by lot for redemption on May 1, 1926, \$750,000 principal amount of the bonds.

Ajax Rubber Co.—New York Stock Exchange has received notice from this company of a proposed increase in capital from 500,000 to 1,000,000 shares. Company officials say the increase is intended to supply the company with treasury stock which it formerly lacked.

Industrial Acceptance Corp., organized to operate the automobile financing division of the Industrial Finance Corp., reports net 1925 earnings \$1,055,978 on a business volume of about \$70,000,000, with cash reserves in excess of \$6,000,000.

Budd (E. G.) Mfg. Co., stockholders have approved changing the \$100 par common stock into no par common. The basis of conversion will be eight shares of new for each share of common stock held, it is reported.

Sewell Cushion Wheel Co. has called for payment April 1, 1926, at 105 and interest, \$24,500 of its first and collateral trust 8 per cent bonds, due April 1, 1942, at the Security Trust Co., Detroit.

B. F. Goodrich Co. has made application to the New York Stock Exchange to list its \$500,000 additional first mortgage 25-year 6½ per cent gold coupon bonds, due July 1, 1947.

GOODYEAR TO LOCATE NEW SOUTHERN MILLS

ATLANTA, March 25—The Goodyear Tire & Rubber Co., Akron, has announced plans for the establishment this year at Cedartown, Ga., of a southern factory branch for the textile department of the company.

Goodyear has purchased a part of the Cedartown mill properties of Charles Adamson, president of the Cedartown Cotton & Exporting Co., and will enlarge the mill building to a capacity of 20,000 additional spindles for the production of tire fabric for the Goodyear factory at Akron.

The plant will be in operation this summer with about 600 operatives and will run day and night.

New Castings Firm Formed in Buffalo

BUFFALO, March 22—Metal Mold Castings, Co., Inc., has been organized here with a capitalization of 1,000 shares of preferred stock, par value \$100, and 10,000 shares of no-par common, to manufacture permanent mold aluminum castings. The corporation has purchased by stock transfer the assets of the Bronzo Alumina Corp., one of the oldest and best known manufacturers in this industry. The business and properties will be turned over to the new corporation April 1.

Officers of Metal Mold Castings Co., Inc., will be Theodore H. Pickering, president; J. Earnest Kauffmann, vice-president and chief engineer, and James Donaldson, secretary and treasurer. Mr. Pickering was formerly foundry manager of Josiah Anstice & Co., Rochester. Mr. Kauffmann was president of the Bronzo Alumina Corp. since its formation and is known as an authority in this work. Mr. Donaldson was associated with the Bronzo Alumina Corp. for the last six years. He will also act as sales manager of the new company.

Motor Products Net Off

DETROIT, March 22—Motor Products Corp. for the year ending Dec. 31, 1925, reported a net profit of \$975,624 after taxes, equivalent after preferred dividends to \$11.91 a share earned on outstanding 62,500 shares of no par common stock.

This compares with \$1,024,233 or \$13.14 a share for 1924.

Watson-Rex Merge

SYRACUSE, March 22—The Watson Truck Co. of Canastota, has been reorganized and will be merged with the Rex Mfg. Co. of that city. The stockholders voted to form the new corporation with 25,000 shares of common stock to provide \$400,000 additional capital.

Bosch Sees Profit in Subsidiary Sale

Withdrawal from Starting-Lighting Field Will Permit Concentration, Says President

NEW YORK, March 22—American Bosch Magneto Corp. shareholders have received a letter from Arthur T. Murray, president, explaining that the proposed sale of the starting and lighting equipment business of the corporation to the Electric Auto-Lite Co. will permit the corporation to withdraw on most favorable terms from a highly competitive industry for which its plants are least favorably located.

Mr. Murray adds that the business proposed for disposal showed a loss from operation last year and that the sale would permit concentration of all the corporation's energies on its profitable line of automotive accessories and radio, for which the Springfield plant is especially designed and equipped, and from which all 1925 earnings were received.

The sale would also substantially increase working capital and permit its use "in a profitable business rather than in handling a large volume with little or no profit."

Upon consummation of the sale it is the intention to liquidate Gray & Davis Corp., a subsidiary, disposing of its Amesbury and Cambridge, Mass., plants and retaining all its funded and floating indebtedness. American Bosch Magneto would then be in a position to pay off its bank loans, which on Dec. 31 were \$800,000 and at the same time substantially increase cash on hand.

The sale would leave the corporation with a ratio of current assets to current liabilities of over four to one and with ample working capital, and Mr. Murray expects earnings from the accessory, radio and magneto business to be substantial.

Reed Succeeds Affleck as Auto-Lite Director

TOLEDO, March 23—Directors of the Electric Auto-Lite Co. were reelected at the annual stockholders' meeting today, with the exception of E. T. Affleck, no longer with the company, who is replaced on the board by E. H. Reed, of Toledo.

The directors are C. O. Miniger, A. E. Buchenberg, J. H. Householder, E. H. Reed, of Toledo; Percy H. Johnston, Chemical National Bank, Jansen Noyes, Hemphill, Noyes & Co., and W. A. Phillips, all of New York.

In the absence of President Miniger, the chair was filled by Mr. Buchenberg.

The shareholders approved the plan for purchase of the starting, lighting and ignition business of the American Bosch Magneto Co., and also the program for building additional plant capacity, both of which deals are expected to entail a capital outlay of about \$1,250,000.

Automotive Steels Show Varying Sale

Specifications by Industrial Companies Considered Light—Cold-Rolled Prices Down

NEW YORK, March 25—Somewhat conflicting reports are heard regarding the extent of automotive demand. Some Ohio mills have received considerable in the way of sheet specifications from passenger motor car builders while others say that for a time it looked as though some of the large automotive consumers had resumed buying on a more liberal scale, but that tonnage involved in individual specifications had again tapered off to hand-to-mouth morsels.

Rollers of full-finished automobile sheets are operating at a good rate, and alloy steel interests characterize automotive demand as fair. Bolt and nut manufacturers have opened order books for second quarter commitments at old prices, and are favored with a very encouraging amount of business from motor car builders. Hot-rolled strip steel has firmed, but the market for the cold-rolled is more ragged, and attractive specifications have brought out a \$3 cut under the \$3.90, Pittsburgh or Cleveland, base price. Parts manufacturers are placing liberal orders for cold-finished steel bars which rule steady at \$2.50, Pittsburgh.

A very interesting condition is disclosed by the report of Judge Elbert H. Gary, Chairman of the Board of Directors of the U. S. Steel Corp., published this week. An increase of 13.2 per cent in the production of rolled and finished steel over the 1924 output was attained last year. At the same time, the number of employees in the corporation's manufacturing properties needed to be increased only about four-fifths of one per cent, and the advance in wage scales amounted to an average of only 3 cents per man per day.

A similar story is revealed by the Bethlehem Steel Corp. report made public simultaneously with that of U. S. Steel. Higher earnings are being scored through increased manufacturing efficiency, and not at the expense of the consumer.

The Metal Markets

Pig Iron—It is difficult to get the "low down" on the iron situation, and there appears to be considerable disparity in the tone of the various distributing markets. There were rumors of sales of foundry iron in the Valley district on a \$20 basis, or 50c below the nominally quoted figure. New York sales managers, however, characterized the market as a shade improved, undoubtedly under the influence of the somewhat brighter aspect of the local demand. Automotive foundries, when in the market at all, appear to be buying in single car lots.

Aluminum—Routine shipments of metal from the domestic producer's plants and the warehouses of New York

importers make up the market's principal activity. The price remains pegged at 27c for the 98 @ 99 per cent pure virgin ingots.

Copper—In the absence of any improvement in foreign demand, the market rules easy at virtually unchanged levels. Domestic demand is fair. Automotive brasses are in good demand.

Tin—Famine prices continue. Obviously Far East production is being artificially curtailed to maintain these unreasonable levels.

Lead—Storage battery demand has turned active. The market appears to have turned the corner.

P. R. R. Plans Bus Line Covering 113 Miles

ALTOONA, PA., March 22—A bus service between Altoona and Pittsburgh, covering a distance of 113 miles, is to be operated by a subsidiary company of the Pennsylvania Railroad company, it has been announced here.

The proposed service, which will probably be the longest line in Pennsylvania to operate on a definite schedule, in a large measure, will follow the general course of the main lines of the Pennsylvania railroad.

The subsidiary to operate the line will be known as the Penn Transit Co., for which a charter has been asked from the governor of Pennsylvania. This charter will provide for running of buses in Allegheny, Westmoreland, Indiana, Cambria, Clearfield and Blair counties, making a distinct unit from the other bus companies to be organized. The desired date of starting the service has not been revealed.

Motor Coach Owners Association to be Formed

NEW YORK, March 19—A committee has been appointed to draft by-laws for a motor coach owners association, which would include all bus lines operating in and out of New York City. James Walsh of the Palisades Transportation Co. is chairman of the committee.

Physical and mental tests for bus drivers are said to be under consideration. Eventually a union terminal for motor buses will probably be opened. Meanwhile the association would oppose bills which it considered detrimental and voluntarily cease some practices now incident to bus operation.

Syracuse Plants Busy

SYRACUSE, March 22—Most of the automotive plants in this city are now working at near full capacity. The Brown-Lipe Chapin Co. of General Motors Corp., has more orders on hand than at any time in years.

New Process Gear and the Adams Axle plants are working at about 75 per cent of normal production.

H. H. Franklin Mfg. Co. is working steadily producing 35 cars a day on the present schedule.

Finance Rate War Endangers Credit

North Carolina Banker Counsel Warns Trade to Guard Money Sources

WINSTON-SALEM, N. C., March 20—Subsidy plans of financing motor car sales by dealers are "dangerous and repugnant to free commerce among our people," declared Willis Smith, of Raleigh, N. C., general counsel of the North Carolina Bankers' Association and chief counsel of the North Carolina Automotive Trade Association, in an address today featuring the annual convention here of the automotive trade body.

Mr. Smith asserted that the subsidy plans constituted "unfair competition," which "will tend to drive out of the channels of automobile financing funds much needed in the handling of this great American industry." He added that "it must not be overlooked that four-fifths of the money used in financing automobiles comes from banks and investors generally. When it appears that there is a rate war on among the finance companies, and that rates have been reduced by some companies to a point where they will no longer justify profits in the business, then the bankers and investors become uneasy and immediately curtail the line of credit of such finance companies."

It was pointed out by Mr. Smith that "only yesterday bankers and business men generally regarded automobile time paper with suspicion and distrust." He explained that there are now approximately 1000 finance companies assisting in the sale of automobiles, having a combined capital of \$300,000,000 and doing last year a total business of \$3,500,000,000 of which \$100,000,000 was done in North Carolina. North Carolina finance companies, he said, handled about 15 per cent of the sales in this state.

Body Builders Arrange Space for Parts Show

NEW YORK, March 20—F. D. Mitchell, secretary-treasurer of the Automobile Body Builders Association, announces that the exhibition to be held in connection with the association's sixth convention in Detroit, June 8-10, will be staged in the Grand ballroom of Hotel Statler, the convention headquarters.

Makers of body materials or parts may display samples of their goods and the trade press may distribute or display their publications and literature. Permission of the exhibition committee must be secured for demonstrations.

Car Thefts Increase

ST. LOUIS, March 19—Automobile thefts in twenty-eight large cities increased from 57,331 in 1924 to 77,174 in 1925, the National Automobile Dealers Association announced today. Last year, however, 86 per cent were recovered, as against 83 per cent the year before.

Austin Cuts Loss by Capital Change

Reduction to £3,650,000 Now
Arranged—Management
Committee in Charge

LONDON, March 9 (by mail)—Particulars are issued today of a scheme for the drastic reduction of capital of the Austin Motor Co., the object being to extinguish the capital losses sustained during the early post-war years. These losses amount to £1,350,000 and are to be borne wholly by the preferred ordinary and ordinary shareholders.

The capital is to be reduced from £5,000,000 to £3,650,000 by reducing each preferred share from £1 to eight shillings and each ordinary share from £1 to five shillings. No capital loss is to be suffered by the preference shareholders, but their rights are to be considerably modified in respect of arrears of dividend.

It is stated that when the reduction of capital has been made effective the share capital will be restored to its present nominal amount of £5,000,000 by the creation of 1,350,000 new shares of £1 each (unclassified).

The executive arrangements are to be modified, and in place of Sir Herbert Austin being managing director there will be a management committee consisting of Sir Herbert Austin, whose duties will be the general supervision of the company's affairs, E. L. Payton, in charge of finance, and C. R. F. Englebach in charge of the plant and production.

Tax Credit on Bodies Applicable as Moved

NEW YORK, March 19—The National Automobile Chamber of Commerce has received a ruling from the Internal Revenue Bureau as to adjustment of taxes paid at the 5 per cent rate on automobile bodies which are in the hands of automobile manufacturers, instead of dealers, at midnight, March 28, when the 3 per cent rate goes into effect.

If an automobile manufacturer buys bodies direct from the body manufacturer and in connection with the sales the body manufacturer charges the tax to the automobile manufacturer as a specific item in addition to the price, the automobile manufacturer in paying the tax on the sale of the automobile will be permitted, as has heretofore been the case, to take credit for such tax as he reimbursed the body manufacturer.

The car manufacturer in paying taxes for any period of time subsequent to March 28, 1926, as for example, the month of April, which tax would be due and payable on or before May 31, will not be permitted to take credit for the lump sum of 5 per cent on all bodies held by him at midnight, March 28, 1926, but will be permitted to take credit only in so far as he actually uses these bodies on automobiles sold.

SPICER CLOSES DEAL FOR FRENCH SALES

SOUTH PLAINFIELD, N. J., March 19—Spicer Mfg. Corp. announces an agreement with Societe Glaenzer of Paris for the exclusive rights to manufacture and sell Spicer universal joints in France and Belgium. The Glaenzer company has been Spicer agent for years and more recently has been manufacturing.

The agreement provides for the use by the Glaenzer concern of new patented improvements and technical assistance in production of a complete line of universal joints and propeller shafts, to be known as the Spicer-Glaenzer line.

Metropolitan Section Hears Fuel Discussion

NEW YORK, March 19—At the monthly meeting of the S. A. E. Metropolitan Section, which was held at the Building Trades' Club last night, A. J. Kraemer, assistant petroleum chemist of the Bureau of Mines, Washington, read a paper on the manufacture and qualities of motor gasoline. S. W. Sparrow, mechanical engineer of the Bureau of Standards, discussed improvements looking toward the better utilization of our motor fuel and of lubricants, and Willard Lord, manager of the service department of the Harrolds Motor Co., talked on fuel and lubricant problems from the standpoint of those who have to educate the public in the proper use of their vehicles.

F. K. Glynn, secretary of the Section, acted as chairman. C. B. Veal, of Manly & Veal, reported for the Governing Committee that the changes in the constitution and by-laws of the Section which had been proposed by the S. A. E. Council to make them correspond to the constitutions and by-laws of other sections, had been approved.

Neil MacCoull, chairman of the Section, was elected its member on the national nominating committee, with A. F. Masury, vice-chairman, as alternate.

Bowser Discontinues Milwaukee Operations

FORT WAYNE, IND., March 22—The S. F. Bowser Co. has announced that the Milwaukee plant of the company is being dismantled and that all manufacturing operations will center in the Fort Wayne plant.

The Milwaukee plant was formerly the property of the Richardson Phenix company and was purchased by the Bowser concern in 1922. The change of the Milwaukee plant to Fort Wayne will be completed in about 60 days. H. J. Grosvenor, vice-president in charge of manufacturing, is now in Milwaukee arranging the transfer of machinery. The change will increase the employees of the Fort Wayne plant about 200.

Citroen to Build Large Model Only

Five Horsepower Model With-
drawn and Prices on Ten
Greatly Reduced

PARIS, March 10 (by mail)—Clipping 3,230 francs off his sedan and 2,230 francs off his phaeton, Citroen has just come out with the bold announcement that he is now on a one-model policy. The Citroen sedan, with a Budd all-metal body, front wheel brakes and balloon tires, now costs 25,000 francs (\$927 at present exchange) while the phaeton, also with all-metal body, is catalogued at 20,000 francs (\$741).

This is the first official announcement that the 5 hp. Citroen has been withdrawn. It is understood that the small car, while sold in big quantities, was not profitable to the factory. Citroen states that by concentrating on a 10 hp. model, with a four-cylinder engine of 94 cubic inches, it is possible to reduce production costs and make a saving in the initial price which more than compensates for the slightly higher operating costs.

The increased taxation charge of the four-passenger 10 hp. model, compared with the two-seater 5 hp. car is less than \$10 a year, while gasoline and tire costs and general maintenance are very little higher. Citroen and Ford are the two firms in France concentrating on a single model.

United States Leads New Zealand Sales

WASHINGTON, March 24—Imports of automobiles into New Zealand during 1925 show a substantial gain over 1924, according to advices received by the U. S. Bureau of Foreign and Domestic Commerce. Imports last year were 15,268 cars, valued at \$3,110,285, compared with 14,200 cars in 1924, with an import value of \$2,653,621.

Of the total 15,268 cars imported, 6,858 cars, valued at \$1,251,099, came from the United States while Canada ranked second with 5,394 cars valued at \$959,055. The United Kingdom ranked third, contributing 2,782 cars, valued at \$796,000.

Auburn Exports Grow

AUBURN, March 22—Export shipments of the Auburn Automobile company in February exceeded any other month in the history of the company, according to reports issued here this week. As compared with last February the export shipments showed an increase of 400 per cent.

Many new distributors have been added in various countries and factory officials estimate that 1926 will show about 300 per cent increase in foreign sales over last year.

Tire Inventories Climb in January

NEW YORK, March 23—During January, according to the Rubber Association of America, Inc., figures representing 75 per cent of the industry, inventories of high pressure inner tubes, high pressure cord casings and fabric pneumatic increased over December, while shipments declined. Production as well as inventories of balloon inner tubes, balloon casings and solid cushion tires increased, while shipments also declined.

Inventories of 2,195,922 balloon casings in January compared with 1,775,428 in December and 901,031 in January, 1925. Production was 1,416,409 in January, 1,288,965 in December and 546,146 in January last year, while shipments were 1,000,490 in January this year, 1,167,658 in December and 563,315 in the previous January. Balloon casing deliveries were the lowest for any month since last March.

Cord Stocks Highest

January inventories of high pressure cord pneumatic casings were 4,453,490 in January against 3,723,296 in Decem-

ber and 3,562,701 in January, 1925, production was 1,821,383 against 1,876,401 and 1,999,410, and shipments 1,045,302 against 1,265,593 and 1,618,169.

Dura to Move Plant

TOLEDO, March 23—The Dura Co. plans to begin its new \$500,000 plant here about July 1. The company will prepare to employ 500 men in the new plant. Business is good due to ambitious schedules of manufacturers and preponderance of closed cars. New buildings, it is planned, will be constructed in series so that no interruption of production will be experienced in moving.

Boye-Emmes Rebuilds

CINCINNATI, March 22—Boye & Emmes Co., lathe manufacturers of this city, has placed contracts for the construction of a new plant to replace the structure destroyed in a recent fire. The new factory will be completed in ninety days. Temporary operations are being carried on in a leased building. The new plant will provide for larger output and will be served by a ten-ton traveling crane with 18 ft. clearance.

Wright Orders Near \$3,000,000 on Books

PATERSON, N. J., March 22—During 1925 the Wright Aeronautical Corp. shipped aviation engines and spare parts in the amount of \$3,307,710. The annual report says there has been a real development in commercial aviation during the past year. During the last half of 1925 the corporation shipped 50 engines of the air cooled type for strictly commercial purposes.

The year's net profit of \$710,832 was equal to \$2.85 per share as compared with \$1.70 in 1924. The company has current assets of \$2,900,903, an increase of \$525,000 and net current liabilities, except ordinary accounts payable, amounting to \$236,168, while shipments had a sales value of 50 per cent in excess of 1924 sales.

On Jan. 1 unfilled orders amounted to \$2,785,465 and up to March 22 there have been received \$194,603 in additional orders. The company has government contracts for two experimental models of air cooled radial engines of 350 and 450 hp. Directors expect a continuance of commercial aviation development.

Developments of the Week in Leading Motor Stocks

NEW YORK, March 25—There was a right-about face in sentiment in the financial district on the motor shares during the past week and where only a few days before the sun had been shining and everything appeared rosy, dark clouds began to appear as optimism over the prospects for the motor industry gave way to pessimism and prices of leading speculative issues receded. Company announcements of plans for increased output were swept away and forgotten in a flood of rumors which deluged stock market circles and told of curtailment or plans for curtailment of production and a sudden falling off in retail demand.

Investigation failed to reveal a picture as dark as had been painted, although it did bring out that in various sections of the country there had been some slowing up in the business due to unseasonable weather and some companies had made moderate downward revisions in production schedules.

The rumors, however, served to arouse some apprehension over the outlook and a general state of nervousness existed when Hudson Motor company issued its report of earnings for the first quarter of the year. It had been expected generally that profits would show a gain over last year, reflecting the large increase in shipments, which had been reported as running about 40 per cent over the first three months of the previous fiscal year.

When official earning figures showed profits equal to slightly more than two-thirds of what they were in the same period last year, the announcement came as a bombshell, and there was a rush to "sell the motors." Whether Wall

Street's conclusion that the disappointing Hudson statement proved that there had been a reversal of conditions in the trade remains to be seen. There are still those who believe that the falling off represented a condition peculiar to that company and involving charges against earnings on account of manufacturing policies which cut down profits in the first quarter, and would consequently increase earnings of succeeding fiscal periods.

Nevertheless selling orders which poured into the market when Hudson was around 106 on the tape found weakness and the stock declined rapidly to under 90, a loss of more than \$16 a share in less than four days.

This weakness encouraged selling in other parts of the group. Jordan was singled out because of the disappointing showing made in the company's annual statement recently published and the stock declined from around 55 to under 45. These two issues with Mack Trucks, which suffered a drop of around 8 points, showed the largest losses.

The sensational nature of the declines in these stocks gave the entire motor list an appearance of weakness which was more apparent than real. Stocks like General Motors, Studebaker and Dodge were well supported and held fairly stable showing moderate recessions not considered out of line with the reactionary state of the entire market.

On the whole the motor shares during the past week seemed to be in a process of readjustment similar to that which has been going on in many other groups for the past month or so. Stocks which have been selling inordinately high on

speculative prospects for the future are being brought more directly into line with other issues in their class.

This was well illustrated by the action of General Motors, Studebaker, Hudson and Jordan. Hudson above 110 was selling within 15 points of General Motors at 125. The company last year earned about \$16 a share on its stock in contrast to General Motors earnings of \$21 a share and paid in dividends \$3 a share in contrast to General Motors payment of \$12. Jordan earning \$3.50 a share in 1925 and paying \$3 at 55 was selling within a few points of Studebaker which earned \$8.50 and paid \$5.25 a share. Obviously on the basis of earnings and dividends, which are considered two prime speculative influences, these issues were out of line; a condition arguing for either an advance in General Motors and Studebaker, or a decline in Hudson and Jordan.

The readjustment witnessed last week emphasizes the need for careful discrimination in the purchase of stocks at their present high levels. It is hardly necessary to go beyond this levelling process for an explanation of the recent market action of the motors. Motor sales have been holding up well and so have the average run of motor stocks. If the advent of spring weather brings with it the retail buying forecast by operations in January and February, there seems to be little basis to change expectation of record profits for leading motor companies during the first six months of the year which should act as at least a stabilizing influence on their stock quotations.—E. S.

Parts Report Shows Big February Gains

Production Rate Index at 154
—March Operations Indicate Further Gains

NEW YORK, March 20—February automotive parts and accessory business gained over the high pace set in January, and March is expected to be another big month.

The majority of the large number of members of the Motor & Accessory Manufacturers Association contributing to the monthly symposium on the business outlook anticipate a large business in 1926.

The production rate in February was at an index figure of 154 compared with 132 in January.

Report from factory centers indicated that March business also would run high, and association members look for a continuance of business on the same high level throughout the second quarter, and in fact throughout the year. The association March bulletin shows the greatest gains for February in shipments of parts and accessories for original equipment and in service equipment.

With business of January, 1925, represented by a base index of 100 a large representative group of manufacturers reported original equipment shipments in February at 160 as compared with 137 in January, replacement parts and sales at 114 comparing with 103, accessory business at 139 comparing with 127, and service equipment shipments at 138 compared with 115.

U. S. Light & Heat Corp. Announces New Battery

NIAGARA FALLS, N. Y., Mar. 19—A problem in connection with automobile and radio batteries is that of shipping wet batteries without losing any acid. The U. S. Light & Heat Corp., makers of USL storage batteries, announces the development of a battery which is charged and shipped, less acid, and which contains specially treated Port Oxford cedar separators. The new battery is known as the USL Add-Acid.

By adding acid within a reasonable period, distributors and automobile manufacturers have a battery ready for service which has not lost any of its service life by standing idle. The new battery also eliminates battery-charging expense while the battery is held by the dealer.

Hire Foundry Leases Former Avery Plant

PEORIA, ILL., March 19—The Hire Foundry Co., Averyville, has leased the big Avery plant No. 2, and completed its incorporation with \$25,000 capital to begin production about April 1 of casting gray iron, nickel chroming and semi-steel castings, to supply the Caterpillar Tractor, Herschel Mfg., Corn Products

Refining, Essco Mfg. and other Peoria and Chicago firms as well as the Avery company work. A force of 100 employees will be utilized in the plant. H. R. Hire, president and manager of the plant, was secretary and manager of the Crown Foundry company, East Peoria, the last four years and has been identified with the Maytag Washing Machine Co., Newton, Iowa, as assistant foundry superintendent and prior to that was with the Acme company 12 years. Other officers of the company are: N. Mass, vice-president and Paul Miller-eit, secretary-treasurer.

Bosch 1925 Income Reported \$521,393

NEW YORK, March 24—The American Bosch Magneto Corp., income account for the year ended Dec. 31, 1925, shows net income of \$521,393. Earnings per share, based on capital stock outstanding at the end of the year, were \$2.51, compared with 78 cents in 1924.

Net sales for the year are not reported. In 1924 they totaled \$10,467,308 when the net income was \$107,626.

The comparative balance sheet, Dec. 31, reveals total current assets \$4,638,373, compared with \$4,263,692 the year previous and total current liabilities \$1,996,554, compared with \$1,675,633 in 1924.

Net working capital, based on current assets and current liabilities, is \$2,641,819.

Waterloo Engine Takes Deere Tractor Title

WATERLOO, IA., March 19—The Waterloo Gasoline Engine Co., manufacturers of tractors and gas engines, acquired several years ago by Deere & Co., has amended its articles of incorporation to take the name Deere Tractor Co., and will become identified with the Moline agricultural implement concern. It will have full facilities of the Deere sales and distribution organization. Allen H. Head, secretary and general manager, announcing the change in organization, said that the firm has revised its designs of tractors and engines to meet developments in the field and adapt the Deere line under which it is now being marketed.

Boveri Assets Grow

NEW YORK, March 25—The American Brown Boveri Electric Corp., established last October, has issued a statement in which it reports that as of Dec. 31, 1925, the corporation had consolidated assets of \$36,788,398, of which current assets were \$12,899,873, compared with current liabilities of \$1,936,529.

Reserves for amortization, depreciation, contingencies, etc., amount to \$10,890,104 or 29 per cent of total assets, according to the balance sheet.

Directors have declared an initial dividend of 50 cents a share on the participating stock, payable April 20, to stock of record April 10.

Studebaker to Move Detroit Departments

Will Centralize All Executive
Departments at South Bend
After September

SOUTH BEND, March 22—The Studebaker Corp., of America's manufacturing, engineering and purchasing departments, now at Detroit, with their executive staffs and personnel, will be moved to South Bend on or before Sept. 1, 1926, according to a statement issued by A. R. Erskine, president. The home office at South Bend will then be headquarters of all of the executive departments of the corporation.

Manufacturing plants 3, 4, 5 and 10 of the corporation at Detroit will continue in operation as usual. These plants manufacture Studebaker big six and special six models and service parts. The corporation expects to increase and expand its Detroit operations, possibly within the current year.

The new building now being erected at South Bend for the Detroit departments includes modern research and experimental laboratories for the engineering department.

New Lycoming Equipment Will Double Production

WILLIAMSPORT, PA., March 20—John H. McCormick, general manager of the Lycoming Mfg. Co., builders of Lycoming motors, has announced that the first consignment of equipment and machinery sufficient to double the capacity of the plant, increase its working force and enable it to eliminate night production has been received. Many more carloads of equipment and machinery are to follow.

The general manager of the company announces that the company by acquiring the new equipment will be able to add to its present force during the season at which business is at a peak and which gets in full swing during the months of March and April. One of the advantages is the elimination of the night shifts.

The conveyors obtained are of the latest type in the automotive manufacturing field and will facilitate the moving in the plant of motors and their parts as they pass through the various departments in process of manufacture.

Marlatt Battery Expands

DANVILLE, ILL., March 19—The Marlatt Battery Co. is launching a program of expansion which will bring its annual production to 75,000 batteries. Plans for the expansion program were outlined this week at a dinner to heads of department, sales and distribution representatives at which Jacob Adams, newly appointed research engineer, was introduced. Plate pasting and grid casting machinery are being installed to provide for the increased output.

Bates Reorganizes, Officers Continue

JOLIET, ILL., March 20—The Bates Machine & Tractor Co., this week announced completion of its reorganization and will hereafter operate as the Bates Manufacturing Co. with a capital of \$400,000. It has taken over the plant, equipment and all assets of the old company and maintains the same executive personnel with W. O. Bates, president. The company will specialize in its crawler type of farm tractor, known as the Bates Steel Mule and make a line of heavy tractors for road building and crawler machinery for converting Fordson and other tractors into the crawler type for road construction. The plant also produces Corliss engines, general power plant machinery and feed water heaters. Orders now on the books promise a busy year and its export business is particularly promising. The Bates concern organized in 1889 and broadened its field to include power plant machinery and in 1912 began crawler type tractor production and within seven years was leading the field in manufacture of this line.

Battery Tester Out Soon

JACKSON, MICH. Mar. 19—The Jackson Battery Tester Co., a new concern backed by local men, will start manufacturing operations about Apr. 1. The company will make a battery tester which, it is said, can be mounted on the dashboard of any make of automobile. The various parts which will go to make up the completed article will be manufactured in Jackson.

Dies and equipment are being installed at present. A small force of men will be employed at the start, the number being increased as production warrants.

Coming Feature Issues of Chilton Class Journal Publications

May—Automobile Trade Journal—Biggest Market Issue.

May 6—Motor Age—Sales and Service Reference Number

J. T. Lee Co. Incorporates Lee & Clark, Inc.

CHICAGO, March 19—Lee & Clark, Inc. has recently been formed to take over the business conducted as a partnership under the name of James T. Lee Co.

James T. Lee is president of the new concern and John O. Clark is vice-president. Offices are maintained at 549 W. Washington Blvd. here. The company specializes in hydraulic equipment, plate working tools, metal working machinery, pumps, car wheel borers, pipe benders, flexible steam points, etc. Mr. Lee was formerly vice-president of the Hanna Engineering Works, of this city. Mr. Clark was, for a number of years, sales manager of the same company.

Bragg-Kliesrath Builds

NEW YORK, March 19—The Bragg-Kliesrath Corp., manufacturer of the Vacuum Booster brake for buses, has added a new fireproof building to its plant, with a floor space of more than 25,000 sq. ft., and is now in production on the brake.

P. V. Clodio, director of sales, is completing an international organization of distributors to handle the company's output.

German Air Lines to Add Two Routes

BERLIN, March 10 (by mail)—with the amalgamation of the Deutsche Aero Lloyd and Junkers Companies which has recently been completed, Germany will on April 1 resume air line traffic. The 42 air lines which are to be put in operation do not differ very largely from those operated by the two old companies, except that certain competitive lines which previously overlapped will be eliminated. Two new lines will be put into operation, one Dresden-Prague-Vienna route which will connect Paris, London and Berlin with the Balkan States and Angora, the other a line from Berlin to the Rhineland which, if French assistance is given, will connect with Paris under French operation. The Berlin-Moscow service is now arranged so as to eliminate the overnight stop at Koenigsberg, and will be completed in a single day, thus including considerable night flying at the beginning of the trip.

Imperial Airways is making arrangements to connect up with this service beginning March 30, the schedule being so arranged that the trip from London to Moscow, including an overnight stop in Berlin, will take only 38 hours. Eventually Imperial Airways will incorporate night flying in their schedule thus reducing the time for the London-Moscow trip to a single day as a step for finally putting into effect a London to Peking service of approximately four days en route.

To Vote on Stock Increase

AKRON, Mar. 19—The Akron Rubber Reclaiming Co. announces that a special stockholders' meeting has been called for Apr. 3 to vote on increasing the capital stock from \$500,000 to \$1,000,000.

Calendar of Coming Events

SHOWS

Apr. 3-14 — International Motor Car Show, Frankfort-on-Main, Germany.

May—International Street and Highway Traffic Safety Exhibition, City Hall, Vienna, Austria.

May 25—International Exhibition of Roads, Transport and Touring, Show Grounds, Argentine Rural Society, Palermo, Buenos Aires.

CONVENTIONS

Apr. 14—Tire & Rim Association of America, Inc., Annual Meeting, Hollenden Hotel, Cleveland, O.

Apr. 21-23—American Welding Society, Engineering Societies Building, New York.

May 6-8—National Machine Tool Builders Association, Providence, R. I.

May 13-15—American Gear Manufacturers Association, Tenth Annual Convention, Book-Cadillac Hotel, Detroit.

May 21-28—National Electric Light Association and Electric Truck Manufacturers Association, Atlantic City, N. J.

June 8-10—Automobile Body Builders Association, Detroit, Hotel Statler.

June 14-19—Automotive Equipment Association, Mount Royal Hotel, Montreal, Canada.

June 16-18—Thirteenth National Convention, Society of Industrial Engineers, Philadelphia, Bellevue-Stratford Hotel.

Oct. 4-8—40th Annual Convention, American Electric Railway Association and manufacturers' exhibit, Cleveland Public Auditorium and Annex.

RACES

Apr. 15—Fresno, Cal.

May 1 — Races at opening of new Speedway, Atlantic City.

May 10—Charlotte, N. C.

May 30-31 — 500-mile race, Indianapolis.

June 12—Flag Day races, Altoona Speedway.

June 12-13 — Rudge-Whitworth 24-hour stock car race, Le Mans, France.

Sept. 6—Labor Day races, Altoona Speedway.

S. A. E. MEETINGS

National

June 1-4—Semi-annual meetings, French Lick Springs, Ind.

Sectional

Apr. 7 — Milwaukee.

Apr. 8 — Detroit.

Apr. 8 — Indianapolis.

Apr. 19—Cleveland.

Apr. 22—Detroit.